EXPERIMENTATION AND THE MARKETPLACE THEORY OF THE FIRST AMENDMENT

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 Associate Professor of Law, University of Pennsylvania. My colleagues Steve Burbank, Michael Fitts, Susan Sturm, and Clyde Summers read and commented on earlier drafts of the manuscript. My colleagues C. Edwin Baker, Frank Goodman, Seth Kreimer, and Michael Madow provided generous amounts of time and valuable advice throughout the entire research and writing process. Regina Austin and Alan Watson not only commented on the manuscript, but also expressed continuous support and encouragement for the project. Dr. Robert Kohler of the Department of the History and Sociology of Science at the University of Pennsylvania was extremely helpful in guiding me to appropriate source materials. Our research librarians provided expert assistance in helping me to obtain materials and advice. Lorraine Vance and Deborah Neary exerted extraordinary efforts to type promptly the various versions of the manuscript. Special thanks to Anna Charlton, class of 1989, for her assistance, guidance, and most of all, her patience.

The profession of science is the search for truths about the natural world; more precisely, it seeks verifiable generalizations that simplify human comprehension and prediction of natural phenomena.

—Lederberg, *The Freedoms and the Control of Science**

[S]cience, in all its senses, is a social process that both causes and is caused by social organization. To do science is to be a social actor engaged, whether one likes it or not, in political activity.

—R. Levins & R Lewontin, *The Dialectical Biologist***

INTRODUCTION

In recent years, a number of scholars have argued that the first amendment to the United States Constitution[1] provides some degree of

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* Lederberg, *The Freedoms and the Control of Science: Notes from the Ivory Tower*, 45 S. CAL. L. REV. 596, 599 (1972).

** R. LEVINS & R. LEWONTIN, THE DIALECTICAL BIOLOGIST 4 (1985) (emphasis omitted).

[1] U.S. CONST. amend. I.

protection to "scientific research" or "scientific inquiry."[2] For example, in testimony before a congressional committee examining the constitutionality of regulating recombinant DNA research, Professor Thomas

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[2] *See, e.g., Science Policy Implications of DNA Recombinant Molecule Research: Hearings Before the Subcomm. on Science, Research and Technology of the House Comm. on Science and Technology,* 95th Cong., 1st Sess. 875 (1977) [hereinafter Emerson testimony] (testimony and statement of Thomas Emerson, Lines Professor of Law Emeritus, Yale Law School); I. CARMEN, CLONING AND THE CONSTITUTION (1985); Berger, *Government Regulation of the Pursuit of Knowledge: The Recombinant DNA Controversy,* 3 VT. L. REV. 83 (1978); Delgado, Bradley, Burkenroad, Chavez, Doering, Lardiere, Reeves, Smith & Windhausen, *Can Science Be Inopportune? Constitutional Validity of Governmental Restrictions on Race-IQ Research,* 31 UCLA L. REV. 128 (1983) [hereinafter Delgado, *Race-IQ Research*]; Delgado & Millen, *God, Galileo, and Government: Toward Constitutional Protection for Scientific Inquiry,* 53 WASH. L. REV. 349 (1978); Favre & McKinnon, *The New Prometheus: Will Scientific Inquiry Be Bound by the Chains of Government Regulation?,* 19 DUQ. L. REV. 651 (1981); Ferguson, *Scientific and Technological Expression: A Problem in First Amendment Theory,* 16 HARV. C.R.-C.L. L. REV. 519 (1981) [hereinafter Ferguson, *Scientific Expression*]; Ferguson, *Scientific Inquiry and the First Amendment,* 64 CORNELL L. REV. 639 (1979) [hereinafter Ferguson, *Scientific Inquiry*]; Goldberg, *The Reluctant Embrace: Law and Science in America,* 75 GEO. L.J. 1341 (1987) [hereinafter Goldberg, *Reluctant Embrace*]; Goldberg, *The Constitutional Status of American Science,* 1979 U. ILL. L.F. 1 [hereinafter Goldberg, *Constitutional Status*]; O'Neil, *Scientific Research and the First Amendment: An Academic Privilege,* 16 U.C. DAVIS L. REV. 837 (1983); Robertson, *The Law of Institutional Review Boards,* 26 UCLA L. REV. 484 (1979); Robertson, *The Scientist's Right to Research: A Constitutional Analysis,* 51 S. CAL. L. REV. 1203 (1977) [hereinafter Robertson, *Scientist's Right*]; Comment, *Considerations in the Regulation of Biological Research,* 126 U. PA. L. REV. 1420 (1978); Note, *First Amendment Protection for Biomedical Research,* 19 ARIZ. L. REV. 893 (1977).

In a recent analysis concerning experiments involving nonhuman animals, Professor Dresser acknowledges that "the movement to strengthen legal controls over research on animals has grown in size and intensity." Dresser, *Research and Animals: Values, Politics, and Regulatory Reform,* 58 S. CAL. L. REV. 1147, 1147 (1986). Although Professor Dresser advocates reform of the current regulatory structure, she observes that "governmental restriction of scientific research has long been suspect in our nation," *id.,* and that one of the "frequently voiced objections to the review of animal research [is that] . . . federal oversight violates the scientist's first amendment right of free inquiry," *id.* at 1191. Professor Dresser accepts that "there are convincing legal reasons for postulating the existence of . . . a [first amendment] right" to engage in animal experimentation and that only "compelling" state interests will suffice to justify the regulation of animal experimentation. *Id.* Congress has amended the Animal Welfare Act, 7 U.S.C. §§ 2131-55 (1982 & Supp. III 1985), which concerns the use of nonhuman animals in experiments. *See* The Food Security Act of 1985, Pub. L. No. 99-198, 99 Stat. 1354, 1645. Concern for free inquiry dominated congressional hearings on the amendments and the resulting legislation carefully avoided any meaningful restrictions on animal experimentation. The sponsor of the amendments in the House of Representatives noted that the amendments "would not interfere with the freedom of the decision of a scientist to conduct an experiment but instead [would take] precautions to ensure that humane handling of the animals occurs whenever possible." *Improved Standards for Laboratory Animals Act; and Enforcement of the Animal Welfare Act by the Animal and Plant Health Inspection Service: Hearing on H.R. 5725 Before the Subcomm. on Department Operations, Research, and Foreign Agriculture of the House Comm. on Agriculture,* 98th Cong., 2d Sess. 2 (1984) (statement of Rep. George Brown).

Emerson stated, "[t]here can be no doubt that the First Amendment provides extensive protection to freedom of scientific research."[3] Professor Emerson discussed the various components of DNA research and observed that the "development [and] exposition of theoretical ideas about DNA and other genetic materials and processes is clearly expression[,] . . . [but] [t]he more difficult question is the classification of experimentation."[4] Professor Emerson observed that "[e]xperimentation is a vital feature in the development of new information, ideas, and theories."[5] He analogized experimentation to "marching in a demonstration, the publication of a newspaper, and the organization of a political party,"[6] but added that he would classify particularly hazardous experimentation as "action" not subject to first amendment protection.[7] Professor Emerson has noted elsewhere that a "hard" first amendment problem "now looming on the horizon . . . [is] whether certain kinds of . . . research may be prohibited or regulated."[8]

Although there are various approaches to the issue, scholarly comment thus far has generally endorsed some version of Professor Emerson's approach. Indeed, one of the leading casebooks in the area of law and science reports that experimentation is accorded first amendment protection.[9] Not surprisingly, a recent study of experimenters involved in recombinant DNA research indicated that most believed that the

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[3] Emerson testimony, *supra* note 2, at 876.

[4] *Id.* at 878-79.

[5] *Id.* at 879.

[6] *Id.*

[7] *See id.* For a further discussion of Professor Emerson's distinction between "expression" and "action," see T. EMERSON, THE SYSTEM OF FREEDOM OF EXPRESSION 17-18 (1970).

[8] Emerson, *Colonial Intentions and Current Realities of the First Amendment,* 125 U. PA. L. REV. 737, 746 (1977) (footnote omitted).

A recent example of the "hard" questions "looming on the horizon" is the controversy surrounding an experiment involving the injection of genetically altered bacteria into elm trees. The experiment, conducted by a researcher at Montana State University, was part of an attempt to control Dutch elm disease. Rather than wait for Environmental Protection Agency approval to release the genetically-altered material, the researcher proceeded to test. The Environmental Protection Agency responded to the violation of its regulations by imposing relatively mild sanctions on the researcher, although scientists at the researcher's institution terminated the experiment by destroying the injected trees. *See The Dutch Elm Imbroglio,* THE ECONOMIST, Sept. 12, 1987, at 30; Schneider, *U.S. Imposes Some Curbs on Gene Expert Who Defied Rules,* N.Y. Times, Aug. 28, 1987, at A10, col. 7; Schmeck, *Panel Discounts Special Hazards in Gene Splicing,* N.Y. Times, Aug. 15, 1987, at A1, col. 5, A7, col. 3; Schneider, *Experts Seek End to Gene Tree Test,* N.Y. Times, Aug. 15, 1987, at A7, col. 6; Boffey, *Tree Scientist Tests Bacteria, Disobeying U.S. Regulations,* N.Y. Times, Aug. 14, 1987, at A1, col. 7.

[9] J. AREEN, P. KING, S. GOLDBERG & A. CAPRON, LAW, SCIENCE AND MEDICINE 511 (1984).

first amendment protected their activities.[10] Freedom of scientific inquiry has been discussed to some degree in the courts, but the first amendment status of government regulation affecting experimentation has never been faced squarely.[11] This Article will refer throughout to

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[10] *See* I. CARMEN, *supra* note 2, at 143-53. Professor Carmen reports that 63% of the DNA researchers he interviewed agreed that experimental investigation was protected by the first amendment. *See id.* at 144; *cf. Improved Standards for Laboratory Animals: Hearing on S. 657 Before the Senate Comm. on Agriculture, Nutrition, and Forestry*, 98th Cong., 1st Sess. 52 (1983) (statement of Frank Standaert, American Ass'n of Medical Colleges) ("[Regulation] of research methods and practices . . . is properly the responsibility of scientific experts, operating within the peer review system.").

[11] For a discussion of cases concerning the constitutional status of research, see Robertson, *Scientist's Right, supra* note 2, at 1240-47. Cases decided since Professor Robertson's article have not clarified the status of research in any substantial way and have dealt largely with whether "academic freedom," a notion related to the first amendment, insulates academics from responding to subpoenas relating to research or to tenure decisions. In Dow Chem. Co. v. Allen, 672 F.2d 1262 (7th Cir. 1982), the court affirmed a lower court decision refusing to enforce an administrative subpoena that required disclosure of certain information by university researchers whose testing on animals was financed by the government. The appellate court found that disclosure would be burdensome but also relied on a theory that the researchers were immune as a result of their academic freedom. *See infra* notes 86-92 and accompanying text. The Seventh Circuit has since weakened *Allen* by holding that a drug company may discover uncompleted genital cancer research despite claims by the researcher that such discovery would jeopardize his first amendment rights. The court found that the hardship to the discovering party may outweigh the researcher's right. *See* Deitchman v. E.R. Squibb & Sons, 740 F.2d 556, 560-61 (7th Cir. 1984); *see also* EEOC v. Franklin & Marshall College, 775 F.2d 110, 117 (3d Cir. 1985) (upholding subpoena of tenure records because the academic freedom involved in deciding tenure had to yield to congressional intent to eradicate discrimination in educational institutions), *cert. denied*, 106 S. Ct. 288 (1986); EEOC v. University of Notre Dame, 715 F.2d 331, 340 (7th Cir. 1983) (reversing order of lower court to enforce subpoena concerning tenure records); Gray v. Board of Higher Educ., 692 F.2d 901, 909 (2d Cir. 1982) (allowing discovery concerning an adverse tenure decision although the court was not clear on whether a qualified academic freedom privilege to resist discovery exists); *In re* Dinnan, 661 F.2d 426, 431 (5th Cir. 1981) (refusing to recognize any academic freedom privilege), *cert. denied*, 457 U.S. 1106 (1982); Wright v. Jeep Corp., 547 F. Supp. 871, 875-76 (E.D. Mich. 1982) (ordering disclosure of research information and rejecting magistrate's quashing of subpoena based on academic freedom of researcher). These cases are more properly viewed as involving claims of privilege, and not as addressing the constitutional status of experimentation. In addition, even if researchers are protected to some degree from responding to subpoenas, such protection would only recognize the institutional autonomy of researchers and not any special access rights that experimenters would have to engage in experimentation. *See infra* notes 171, 200 and accompanying text.

The courts have generally rejected claims that researchers have constitutional rights to engage in fetal research. *See, e.g.*, Margaret S. v. Edwards, 488 F. Supp. 181, 220-21 (E.D. La. 1980) (holding, in a case involving a Louisiana abortion statute, that "the rights of medical researchers are not fundamental under the Constitution" and are, therefore, "subject to the less demanding test of rationality" (citation omitted)); Wynn v. Scott, 449 F. Supp. 1302, 1322 (N.D. Ill. 1978) (holding that medical researchers did not have fundamental rights to engage in research using fetuses), *aff'd sub nom.* Wynn v. Carey, 599 F.2d 193 (7th Cir. 1979).

arguments in support of first amendment protection for experimentation as "the general view."

For the most part, the general view argues that scientific research generates epistemologically superior input into the "marketplace of ideas."[12] The marketplace model of the first amendment, which is the generally accepted judicial choice among first amendment theories,[13] maintains that "truth" or, alternatively, the "best solution" will emerge from a "free trade in ideas."[14] Scientific research, it is argued, introduces into the marketplace facts whose veracity has been thoroughly tested by the "scientific" process of verification in strict conformity to "scientific method."[15] Indeed, Professor Emerson argues that the protection of speech as "vital to the process of discovering truth, through exposure to all the facts,"[16] was accepted by the colonists and "developed in conjunction with, and as an integral part of, the growth of the scientific method."[17] Thus, the general view concludes that the marketplace of ideas and the scientific method function best when scientifically reliable "facts" enter that marketplace.[18]

This Article examines critically the claim that experimentation is protected by the first amendment. Part I examines and rejects the arguments under marketplace theory that experimentation per se is "expression" or "expressive conduct." Experimentation does not become expressive conduct merely because it facilitates the scientific process. Generally speaking, there is nothing inherent in the experimental process that allows that process to be characterized as "expression" or "expressive conduct." If experimentation is itself expressive under market-

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[12] *See infra* notes 30-34 and accompanying text.

[13] *See generally* G. GUNTHER, CONSTITUTIONAL LAW 977 (11th ed. 1985) (calling Holmes's marketplace rationale for free speech "among the best known articulations" of first amendment values); J. NOWAK, R. ROTUNDA & J. YOUNG, CONSTITUTIONAL LAW 863-64 (2d ed. 1983) (treating the development of marketplace theory from John Milton, through J.S. Mill, to Justice Holmes as the "initial justification for a system of free speech"); L. TRIBE, AMERICAN CONSTITUTIONAL LAW § 12-1 (1978) (noting that the marketplace theory is the "most familiar theory of free speech").

[14] *See, e.g.*, Abrams v. United States, 250 U.S. 616, 630 (1919) (Holmes, J., dissenting).

[15] *See* Robertson, *Scientist's Right, supra* note 2, at 1205.

[16] Emerson, *supra* note 8, at 740.

[17] *Id.* at 741. Professor Goldberg observes that "[t]he framers of the Constitution envisioned considerable federal encouragement for scientific endeavors both through the enumerated congressional powers and through the protections of the religion, speech, and press clauses." Goldberg, *Constitutional Status, supra* note 2, at 32. Professor Goldberg argues, inter alia, that "[o]ne purpose [of the establishment clause] was to prevent the suppression of enlightened science by the Church." *Id.* at 5.

[18] To a much lesser degree, and with almost no discussion or argument, some commentators seek to protect experimentation as an aspect of the self-fulfillment of the experimenter rather than as an integral part of the marketplace of ideas. *See infra* note 221.

place theory, then the first amendment protects that expression, and there is no need for any special first amendment protection for experimentation.

Part II of the Article examines the arguments that experimentation should be protected as a nonexpressive "precondition" of the ultimate dissemination of scientific speech, concluding that the first amendment generally does not provide protection for the noncommunicative preconditions of speech. Furthermore, any reliance on a "preconditions" argument necessitates some appeal to currently accepted notions of "appropriate" scientific methodology to determine which preconditions would be protected. Such an appeal would present both practical and theoretical difficulties for the marketplace theorist.

Parts I and II together present the paradox involved in relying on marketplace theory to support first amendment protection for experimentation. Using marketplace theory to protect experimentation raises problems that cannot be solved without resorting to solutions that are inimical to that theory. These solutions invariably involve resort to problematic interpretations of "expression" or require content discrimination in the guise of an appeal to "true" or "valid" science. The thrust of this analysis is that, if experimentation does not involve communication and if government regulation of nonexpressive experimental activity is not intended to suppress the dissemination of information, then under the marketplace theory of the first amendment, restrictions on experimentation need only be rationally related to a legitimate government interest.

This Article recognizes that application of the rational basis test to the regulation of research may produce results that are controversial and ostensibly problematic. For example, under this analysis, the government could, without satisfying the standards set forth in *United States v. O'Brien,*[19] prohibit all research involving genetic engineering as long as the purpose of the prohibition is not to suppress dissemination of information derived from such research.[20] Because the rational

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[19] 391 U.S. 367 (1968). In *O'Brien,* the Court set forth a balancing approach to analyze governmental regulation of conduct that has a "communicative element . . . sufficient to bring into play the First Amendment . . . ." The Court stated:

> [A] government regulation is sufficiently justified if it is within the constitutional power of the Government; if it furthers an important or substantial governmental interest; if the governmental interest is unrelated to the suppression of free expression; and if the incidental restriction on alleged First Amendment freedoms is no greater than is essential to the furtherance of that interest.

Id. at 377.

[20] This approach differs completely from the general view. For example, Professor Emerson argues that his "absolutist" theory would require that experimentation be

basis test entails minimal judicial scrutiny, such a prohibition may be found to be permissible even though the government interest advanced is thought to be "trivial" in comparison to the loss of knowledge produced by such research. Although the political process would in all likelihood be sufficient to protect against the imposition of such a prohibition on "trivial" grounds, it will be argued below that the permissibility of such a prohibition would nevertheless be compelled by the very theory of the first amendment that has been used to justify protection of research.[21]

It is further recognized that this analysis rejects the argument that marketplace theory may provide protection to experimentation through some general right to acquire knowledge. Again, for reasons explained below, marketplace theory cannot accommodate a right to receive that is not in some sense correlative to a right to transmit information.[22] To the extent that the general view seeks to protect a right to acquire information divorced from the right to transmit, it must rely on content-related methods to determine the ambit of the protected acquisition activities. Rejection of such methods might conceivably allow the state to engage in regulations that would have undisputed impact on core first amendment values.[23] This Article maintains that marketplace theory generally cannot provide satisfactory criteria to delimit protected

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categorized as "expression" or "action" at the outset, in contrast to "orthodox" first amendment doctrine which, according to Professor Emerson, would accord prima facie protection to "all forms of experimentation" and would then use various other "balancing" doctrines to determine whether the experimentation in the particular case would be protected. *See* Emerson testimony, *supra* note 2, at 887. Whether Professor Emerson's view about the "orthodox" doctrine has ever been true, the Court's decision in Clark v. Community for Creative Non-Violence, 468 U.S. 288 (1984), raises serious question as to whether a court would accord prima facie first amendment protection to "all forms of experimentation." In *Clark,* the Court held that "it is the obligation of the person desiring to engage in assertedly expressive conduct to demonstrate that the First Amendment even applies." *Id.* at 293 n.5; *see also infra* notes 69-73 and accompanying text (discussing *Clark*).

Professor Emerson claims to be an "absolutist" in the sense that once conduct is classified as "expression," then it is protected and cannot be "sacrificed" to the balancing of competing interests and must be given "full protection." T. EMERSON, *supra* note 7, at 19. Professor Emerson has some difficulty in maintaining the "full protection" theory against such competing state interests as maintaining public order. *See id.* at 304. Also, in his initial characterization of "expression" or "action," Professor Emerson, in effect, "balances" the same types of considerations that are employed in nonabsolutist analyses of the first amendment. *See* Emerson testimony, *supra* note 2, at 879-80.

[21] *See infra* notes 29-356 and accompanying text.

[22] *See infra* notes 99-109 and accompanying text.

[23] For example, if the state were to decide to close all libraries temporarily because the glue used to bind books was determined to be hazardous to human health, it could be maintained that nothing in marketplace theory would trigger heightened scrutiny of the state action.

facilitative activities involving the acquisition of knowledge unless the state attempts to regulate those activities in order to suppress ultimate expression.

Three preliminary points should precede any examination of the general view. First, this Article does not say that experimentation receives no protection under the marketplace theory of the first amendment. If experimentation itself embodies communication, then the first amendment applies. Moreover, even if experimentation does not involve communication, the first amendment may apply if the purpose of the government regulation of experimentation is to suppress the dissemination of information that may be derived from experimentation.[24] Although what counts as protected experimentation is by no means clear, this Article agrees with Professor Robertson's observation that "much acquisition or research [such as in the social sciences] involves activities traditionally protected by the first amendment, such as speaking, talking, writing, and publishing . . . . Similarly, scientific publications would ordinarily be protected by first amendment rights to publish."[25] This Article will focus attention on experimentation that is not obviously protected by the first amendment and on the arguments for protection that are predicated on the relationship of experimentation to expression that is protected by the first amendment.[26]

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[24] For example, if the government seeks to regulate experimentation because of a concern that "immoral" information might ultimately be disseminated, then the first amendment would be applicable in a way that it would not be if the governmental purpose was the protection of the health of human or animal subjects.

[25] Robertson, *Scientist's Right, supra* note 2, at 1217. Professors Favre and McKinnon require that "scientific inquiry" be "inquiry . . . focused on the operation of the natural universe." Favre & McKinnon, *supra* note 2, at 665. They would exclude much of social science from what they believe is the protected scope of scientific inquiry to the extent that the social sciences are concerned with human rather than " 'organic' laws." *Id.* at 665. Indeed, they argue that "the professor of sociology who conducts a survey on attitudes about marriage and divorce, perhaps to determine the cause of the increase in divorce rates, would not be engaging in scientific inquiry." *Id.* at 668.

It is not clear whether Professors Favre and McKinnon would deny first amendment protection to the activities described by Professor Robertson as "traditionally protected by the first amendment," or whether Professors Favre and McKinnon simply would not accord those "traditionally protected" activities special status under the first amendment as part of "scientific inquiry." If they intended the latter, they do not describe what implications special status would have for scientific inquiry that is protected under their analysis, and, indeed, they seem to argue that if scientific inquiry is protected, then regulation of such inquiry would be subject to the same analysis applicable to any regulation of expression protected by the first amendment. *See id.* at 729 (advocating use of a standard "essentially the same as the *O'Brien* test").

[26] Although some commentators articulate the notion that "scientific expression" is superior, verifiable input into the marketplace of ideas, they do not suggest that such expression may not be subject to restrictions applicable to other "nonscientific" forms of expression. To the extent that the commentators do view "scientific expression" as being epistemologically superior expression, they may be inclined to treat that expression

Second, this Article will not, with the exception of some brief comments,[27] discuss government funding and conditions attached to funding as involving practical limitations on experimentation. The primary focus will be on the status of experimentation for the purpose of evaluating laws that prohibit or regulate experimentation as a general matter.

Finally, this Article will focus on the difficulties involved in attempts to protect experimentation under the marketplace theory. It will not address whether alternative first amendment theories can provide protection that marketplace theory cannot provide.[28] Marketplace theory is a natural and necessary focus of any critical examination of the general view because of the use of that theory to support the general view.

I. EXPERIMENTATION AS EXPRESSIVE CONDUCT

Because this Article represents the first effort to examine critically the literature expressing the general view that scientific inquiry is protected by the first amendment,[29] it is necessary to consider the various arguments that have been used to justify broad protection.

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more favorably in the balancing process used in cases such as *O'Brien*. If "scientific expression" were treated more favorably, the concerns described in Part II of this Article would be implicated.

[27] *See infra* note 235.

[28] *But see infra* note 148 (relying on commercial speech theory). It should be stated at the outset that the problems that militate against the use of marketplace theory in this context also affect other first amendment analyses, and perhaps even more so. For example, as this Article will argue, if all experimental activity is accorded some prima facie first amendment protection, then courts will have to engage in judgments about the worth of experimentation in conducting the balancing prescribed by *O'Brien*. *See supra* note 19. These judgments will invariably and inevitably result in content-based line drawing impermissible under marketplace theory. It would seem that the problem of line drawing would not disappear if the courts instead applied some "liberty" or "natural right" theory of the first amendment that protected all substantively valued activity, or at least that conduct deemed to be "self-expressive," rather than simply expression or expressive conduct protected under marketplace theory. To argue that *all* conduct that might be considered substantively valued or self-expressive by the actor—experimentation, dancing, singing, playing baseball—was absolutely protected by the first amendment would be difficult. The problem of identifying which substantively valued or self-expressive conduct would ultimately be protected would still exist, in addition to the more basic problem of identifying what constituted substantively valued activity or self-expressive conduct in the first instance. The general view relies almost exclusively on the marketplace theory because that theory emphasizes the importance of expression and information and thereby makes it intuitively appealing for the purpose of justifying the protection of research. If marketplace theory is not successful in this regard for the reasons presented, then it is likely that alternative theories will fail as well for some of the same reasons. Even theorists who would ostensibly protect all substantively valued conduct might have difficulty in extending protection to experimentation. *See infra* note 148.

[29] *See supra* note 2.

A. *The General View*

The published arguments in support of protecting experimentation under the first amendment are all explicitly or implicitly predicated on a marketplace theory of the first amendment.[30] According to that theory, "freedom of expression is an essential process for advancing knowledge and discovering truth."[31] A related doctrine, also part of the general view, is that the first amendment generally requires an unencumbered flow of information to fulfill the goal of promoting rational public and private decisionmaking.[32]

That the general view is predicated upon marketplace theory should not be surprising for at least two reasons. The first reason, offered by Professor Emerson, is that the marketplace theory "is essentially the method of science"[33] in that the theory seeks "progress through free and rational inquiry."[34] Just as scientific method requires that the experimenter test propositions to generate valid knowledge claims, so does the marketplace theory require that all facts and opinions be subjected to opposition and criticism. A fundamental assumption of both marketplace theory and scientific method is that the individual is expected "to make reasoned conclusions based upon the

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[30] *See, e.g.,* Ferguson, *Scientific Inquiry, supra* note 2, at 647 (claiming that unregulated scientific "expression" promotes the discovery of scientific truth); Robertson, *Scientist's Right, supra* note 2, at 1251 (arguing that the utility of scientific information is to be decided in the marketplace of ideas). Delgado and Millen accept the marketplace theory but do not rest their argument entirely on it. *See* Delgado & Millen, *supra* note 2, at 361-71. None of the commentators explicitly discuss their underlying theoretical assumptions in any systematic way or attempt to defend any particular theory of the first amendment.

[31] T. EMERSON, *supra* note 7, at 6.

[32] *See id.* at 7. Professor Meiklejohn originally extended protection only to matters of self-government, *see* A. MEIKLEJOHN, FREE SPEECH AND ITS RELATION TO SELF-GOVERNMENT 22-27 (1948), but later explicitly included philosophy, science, literature, and the arts within his scope of protected expression because these areas are related to self-governance, *see* Meiklejohn, *The First Amendment Is an Absolute,* 1961 SUP. CT. REV. 245, 256-57. The Court has explicitly relied on the "free-flow of information" rationale. *See, e.g.,* Virginia State Bd. of Pharmacy v. Virginia Citizens Consumer Council, 425 U.S. 748, 765 (1976) (citing A. MEIKLEJOHN, *supra,* and noting that the free flow of even commercial information is necessary for well-informed decision).

Some commentators, notably Judge Bork, have argued that the first amendment only protects speech that is expressly political. *See* Bork, *Neutral Principles and Some First Amendment Problems,* 47 IND. L.J. 1 (1971). Of course, adoption of Judge Bork's view would obviate the need to analyze whether experimentation is protected by the first amendment because he explicitly places science outside the scope of protection. *Id.* at 26-28.

[33] Emerson, *supra* note 8, at 741; *see also* Emerson testimony, *supra* note 2, at 876 (testimony on DNA regulation).

[34] Emerson, *supra* note 8, at 741.

evidence."[35]

The comparison of the marketplace to scientific method goes beyond a conceptual analogy; it is also based on a perceived historical connection. "The theory of freedom of expression, indeed, developed in conjunction with, and as an integral part of, the growth of the scientific method."[36] An important part of the general view is that, although much constitutional history may be vague, history indicates clearly that the founders were unequivocally enthusiastic about scientific inquiry, and that this enthusiasm influenced the formation of constitutional concepts, including the first amendment.[37]

The second reason why marketplace theory seems to support protection of experimentation arises from the theory, related to marketplace doctrine, that free expression is protected as an element of rational self-governance and decisionmaking. This protection, it is argued, extends to the free flow of information.[38] Again, supporters of this view see both a logical and a historical connection between science and the first amendment. The logical connection asserted is that scientific information is not merely useful but is essential for public decisionmaking. "Scientists supply the information on which intelligent resolution of many political judgments rests."[39] The historical connection is supported by observations that the founders recognized that "the needs of an enlightened citizenry" required maximum free flow of scientific information.[40] Discussing Jefferson's views of patent law and his concern that the flow of scientific information not be restricted, one commentator has observed, "[i]n Jefferson's reality, the worlds of science and public welfare were evidently one. Truth and freedom went hand in hand. Each was a marketplace, the same self-nourishing marketplace. If passing legislation would help one, it would help the other."[41]

According to the general view, arguments relating to the free flow of information have a special significance in the experimentation context.[42] The general view maintains that there have been historical in-

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[35] *Id.*

[36] *Id.*

[37] *See* I. CARMEN, *supra* note 2, at 3-12; Delgado & Millen, *supra* note 2, at 354-61; Goldberg, *Constitutional Status, supra* note 2, at 2-7.

[38] *See* I. CARMEN, *supra* note 2, at 9-10; Delgado & Millen, *supra* note 2, at 370.

[39] Delgado & Millen, *supra* note 2, at 370 (footnote omitted).

[40] I. Carmen, *supra* note 2, at 10 (citing the failure of Jefferson to apply for patent rights when he might have).

[41] *Id.*

[42] Part of the general view, related to its concern for the free flow of information, is that regulations affecting the *topic* of research are to be judged more severely than regulations incidentally affecting only the *methods* of experimentation. *See* Robertson, *Scientist's Right, supra* note 2, at 1253. The concern is that regulation of experimental

stances when governments have tried to suppress the free flow of scientific information, such as when the Soviet government suppressed all but Lysenko's genetic theories.[43] Lysenko's genetic theories were directed to the "tranformation [sic] of plant varieties (interpreted as the directed transformation of heredity) by means of environmental manipulation and grafting. This work directly contradicted Mendelian genetics."[44] Moreover, history also indicates that "major scientific advances [such as those of Copernicus, Galileo, and Darwin] have sometimes met with significant social resistance."[45] For the marketplace to work, the general view concludes, it is necessary that experimentation be protected so that there will be no government-imposed orthodoxy in science.[46]

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method does not "prevent the development of the desired knowledge altogether" but only "increase[s] the cost of doing research and thus may slow or reduce the development of knowledge and its benefits in given areas." *Id.* The regulation of research topics would more directly affect the development of knowledge and, according to this view, would trigger more thorough first amendment scrutiny. This distinction between the topic and method experimentation is, as a practical matter, less rigid than it sounds. For instance, some experimenters engage in research in which chronic pain is produced experimentally in nonhuman animals. This "research usually necessitates the production of the very sensations and behaviors that ethical guidelines for experimentation dictate must be eliminated or at least minimized." Sessle, *Animal Pain Research,* in SCIENTISTS CENTER FOR ANIMAL WELFARE, EFFECTIVE ANIMAL CARE AND USE COMMITTEES 75, 75 (1987). If a goal of the experimenter is to observe the behavior of a nonhuman animal subjected to various types of pain, a prohibition on the use of nonhuman animals in such an experiment would necessarily be closer to a regulation of "goal" rather than "method"; the pain is a necessary and not merely an incidental part of the research design. Regulations concerning animal experimentation or experimentation involving genetic manipulation provide compelling examples which demonstrate that the distinction between research topic and method is often difficult to make, and characterization as a research "goal" or "method" more often represents a conclusion, rather than a starting point, for first amendment analysis.

[43] *See* R. LEVINS & R. LEWONTIN, THE DIALECTICAL BIOLOGIST 163-66 (1985).

[44] *Id.* at 166. *See generally* Z. MEDVEDEV, THE RISE AND FALL OF T.D. LYSENKO (1969) (explaining the Lysenko phenomenon in terms of the Soviet political system). Medvedev's view has been effectively criticized as not appreciating the complexity of the problem of Lysenkoism. *See* R. LEVINS & R. LEWONTIN, *supra* note 43, at 164 (dismissing as too narrow Medvedev's view of "Lysenkoism as a boil on the body politic"); *see also infra* notes 306-07 and accompanying text.

[45] Ferguson, *Scientific Inquiry, supra* note 2, at 641.

[46] Marketplace theory is concerned with truth, or at least with "reaching the better decision," Emerson, *supra* note 8, at 741, and is based on scientific method. In many respects, however, it is inferior to scientific method. *See* DuVal, *Free Communication of Ideas and the Quest for Truth: Toward a Teleological Approach to First Amendment Adjudication,* 41 GEO. WASH. L. REV. 161 (1972). Professor DuVal argues that it is difficult, if not impossible, to prove whether the marketplace theory is the best test of truth because such proof would require comparisons to be made between societies that accord different protection to expression, or between the beliefs of the same population at two times. The latter would be practically impossible because of "[t]he difficulty of determining the beliefs of an entire population and the effect of factors other than free expression." *Id.* at 191. The former would be difficult for the

The general view employs two further sets of arguments to support protection for research. The first set of arguments focuses on the expressive nature of experimentation. The second set of arguments focuses on experimentation merely as noncommunicative facilitative conduct that is a necessary precondition for protected scientific expression. This is not to say that the arguments come packaged neatly in the two sets described; they do not. Rather, the general view can best be characterized as a confused and confusing amalgam of various doctrines and theories. Separating the strands is, indeed, part of this analysis. In addition, the two sets of arguments will overlap to some degree, most notably with respect to the role of facilitative conduct, or conduct that facilitates expression. The argument that experimentation is expressive rests, at least in part, on the notion that experimentation facilitates pure scientific expression in the way that expressive conduct facilitates speech. Similarly, the argument that experimentation should be protected as a "precondition" of expression also focuses on the facilitative nature of certain conduct. The thrust of this analysis is that marketplace theory, which is in some sense based on "scientific method," has great difficulty in accommodating experimentation per se within its ambit.

B. *Experimentation as Protected Expression*

The remainder of Part I will examine additional arguments that experimentation is expression protected by the first amendment. It will discuss arguments that experimentation is communicative conduct, as well as arguments that experimentation otherwise involves communica-

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same reasons and also because of the difficulty of agreement about whether predictive theories developed in different societies had been confirmed. *See id.* at 193. Professor DuVal apparently retreats from applying this skepticism to scientific method because "the predictive value of the methodologies of gypsies and scientists may be accomplished within a particular society." *Id.*

Professor DuVal would argue that if the Soviets believed in the superiority of Lysenko genetics and the Americans did not, there would be no way to show that free expression had led to a "better" scientific theory in America. Professor DuVal's argument is problematic for two reasons. First, there is no reason why criteria applicable to decide between the predictions of the scientist and the gypsy could not be used to distinguish between the Lysenko and non-Lysenko predictions. Second, for reasons explained below, there are problems with the use of such criteria in any case. For a description of Lysenko's theories, see Z. MEDVEDEV, *supra* note 44, at 20-44.

In a recent article, Professor Wonnell reaches an opposite conclusion. *See* Wonnell, *Truth and the Marketplace of Ideas,* 19 U.C. DAVIS L. REV. 669 (1986). In focusing on Professor DuVal's analysis, Professor Wonnell concludes that there is a connection between free speech and "elite" cultures, such as natural scientists, who produce "truthful" predictions. He defends his analysis on the basis that people in the United States get more truth than people in the Soviet Union. *See id.* at 686-91. *But see infra* note 312.

tion and that "basic" science constitutes protected expression.[47]

1. Experimentation as Communicative Conduct

The first set of arguments represented in the general view focuses on the nature of experimentation as expressive conduct. The general view, although not free of ambiguity, maintains that experimentation involves nonverbal conduct but that such nonverbal conduct is nonetheless *expressive* and, accordingly, falls within the scope of the first amendment. Although the distinction between speech and conduct has led to confusion in case law[48] and copious academic comment,[49] it is

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[47] Part II will focus on the arguments for the protection of experimentation as noncommunicative conduct that facilitates scientific expression.

[48] *Compare* Tinker v. Des Moines Indep. Community School Dist., 393 U.S. 503 (1969) (protecting the wearing of armbands) *with O'Brien,* 391 U.S. 367 (declining to protect the burning of draft cards). For a defense of the different results in these cases, see Ely, *Flag Desecration: A Case Study in the Roles of Categorization and Balancing in First Amendment Analysis,* 88 HARV. L. REV. 1482, 1498-99 (1975) (arguing that the state interest in *Tinker* necessarily depended on the expressive conduct being communicative, while the state interest in *O'Brien* did not). For a criticism of *O'Brien,* see M. NIMMER, NIMMER ON FREEDOM OF SPEECH § 2.06[B] (1984 & Supp. 1987) (characterizing the prohibitive statute in *O'Brien* as overnarrow rather than overbroad).

[49] *See, e.g.,* Ely, *supra* note 48, at 1506-08 (proposing a theory to resolve the apparent conflicts in case law); Henkin, *The Supreme Court, 1967 Term—Foreword: On Drawing Lines,* 82 HARV. L. REV. 63, 76-82 (1968) (arguing that O'Brien's action was indeed speech and, even if unprotected, deserved, at least, "a better opinion").

The notion that there is a clear and meaningful distinction between speech on the one hand and "action" or "conduct" on the other has long been discredited. J.L. Austin argued that when someone says something, she performs certain sorts of *acts.* First, she performs a locutionary act by uttering vocables "with a certain more-or-less definite sense and reference." J. AUSTIN, HOW TO DO THINGS WITH WORDS 95 (1962). Second, in performing the locutionary act, the speaker also performs an illocutionary act, or "an act *in* saying something as opposed to performance of an act *of* saying something." *Id.* at 99. Third, the speaker may perform a perlocutionary act, or the act that the speaker achieves "*by* saying something." *Id.* at 108. For example, assume that the speaker utters the words, "shoot her," where "shoot" refers to the act of using a gun to injure or kill and "her" refers to a particular person. The use of the words with a definite sense and reference is the locutionary act. The illocutionary act may consist of the speaker's ordering or commanding the shooting and the perlocutionary act may be the speaker's persuading or convincing the listener to act. *See id.* at 101-02. Austin further provided a preliminary classification of the various types of illocutionary forces. *See id.* at 148-63. Austin noted that one could draw a distinction between the completion of the illocutionary act as a speech act and all subsequent consequences in such a way that one could not draw a line between nonspeech physical actions, which are generally named by reference to natural consequences, and consequences. *Id.* at 11; *see also* Searle, *What Is a Speech Act?,* in PHILOSOPHY IN AMERICA 221, 223-35 (M. Black ed. 1965) (describing illocutionary acts as rule-governed behavior); Baker, *Scope of First Amendment Freedom of Speech,* 25 UCLA L. REV. 964, 1010 (1978) (dismissing techniques for distinguishing expression from action and questioning the purpose of drawing such a distinction).

Professor Kalven has argued that "all speech is necessarily 'speech plus.' If it is

now generally accepted that some nonverbal expression qualifies for first amendment protection.[50] For example, Professor Emerson distinguishes between communicative conduct classified as "expression" protected by the first amendment and conduct classified as "action," not so protected.[51] In his "tentative" application of this distinction to experimentation, he argues that "it is difficult to state . . . what forms of experimentation should be classified as expression, and what as action"[52] but concludes that some forms of experimentation would be classified as expression if they did not present "a substantial and serious danger to the physical health and safety of the surrounding population."[53] "[T]he concept of expression must be related to the fundamental purposes of the system and the dynamics of its operation."[54]

Professor Emerson concludes that experimentation is analogous to the "marching in a demonstration, the publication of a newspaper, and

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oral it is noise and may interrupt someone else; if it is written, it may be litter." Kalven, *The Concept of the Public Forum:* Cox v. Louisiana, 1965 SUP. CT. REV. 1, 23. Other scholars have accepted Kalven's position and have added that all speech is also "symbolic" because "all expression necessarily requires the use of symbols." M. NIMMER, *supra* note 48, § 3.06[B]. Professors Kalven and Nimmer correctly observe that there is no clear-cut distinction between "symbolic speech" and "speech plus," but the matter is not as hopelessly confused as they suggest. Oral speech involves phonetic acts, or the uttering of noises. Oral speech also involves phatic acts, or the use of words belonging to a vocabulary and conforming to a particular grammar. *See* J. AUSTIN, *supra,* at 95. Nevertheless, one can conceptually distinguish "speech-acts" generally from what are commonly thought of as "physical actions." "Symbolic speech" may be viewed as "physical action," excluding phonetic acts or "writing," that is nonetheless communicative or expressive. Perhaps "symbolic speech" is better thought of as "expressive or communicative nonspeech." Nonspeech can be distinguished from certain combinations of "speech acts" and "physical action" that may or may not be "expressive nonspeech." This is not to say that the distinction is perfect for all purposes; as described above, what is ostensibly "pure" speech may involve "speech acts." It is only to say that the recognition of phonetic acts and phatic acts does not mean that there is no rough distinction between "speech acts" and other "physical action."

[50] The Court has afforded first amendment scrutiny to government regulation of a variety of nonverbal expression. *See* Spence v. Washington, 418 U.S. 405 (1974) (affixing peace symbol to an American flag); Shuttlesworth v. City of Birmingham, 394 U.S. 147 (1969) (marching); Tinker v. Des Moines Indep. Community School Dist., 393 U.S. 503 (1969) (wearing armbands); Edwards v. South Carolina, 372 U.S. 229 (1963) (demonstrating); *see also* Clark v. Community for Creative Non-Violence, 468 U.S. 288, 293 (1984) (assuming, but not deciding, that "overnight sleeping in connection with [a] demonstration [intended to call attention to the plight of the homeless] is protected to some extent by the First Amendment[,]" but stating that "this assumption only begins the inquiry"); *infra* notes 66-69 and accompanying text.

[51] T. EMERSON, *supra* note 7, at 17-20.

[52] Emerson testimony, *supra* note 2, at 879; *see supra* notes 3-8 and accompanying text.

[53] Emerson testimony, *supra* note 2, at 880.

[54] T. EMERSON, *supra* note 7, at 18. Although Professor Emerson accepts that the first amendment implicates numerous values, he and other commentators also accept marketplace theory as the predominant first amendment theory. *See supra* notes 12-14 and accompanying text.

the organization of a political party."[55] Professor Carmen labels protected experimentation as "quasi speech, or what court-watchers presently term 'speech plus,' "[56] and " 'expressive activity,' in other words, conduct central to speech."[57] Professor Robertson argues that the speech/conduct distinction is unhelpful for determining the status of "experimental manipulations of persons or material"[58] because "[m]uch protected expression involves activity or physical movement. Buying and selling books, haranguing crowds, even writing, involve action though no one doubts their first amendment status."[59] He labels research as "expression" that combines "speech and nonspeech elements . . . in the same course of conduct."[60] Even commentators who question whether experimentation is itself communicative, but who nevertheless would extend first amendment protection to experimentation, rely on the same "symbolic conduct" or "speech plus" cases.[61] The general view, then, is that "research" is an activity like "demonstrating," and conduct (experimentation or marching) that facilitates or is functional with respect to the ultimate expression (research or demonstration) is *itself* "speech plus" protected by the first amendment.

The general view reflects Professor Emerson's observation that under "orthodox" theories contained in Court opinions, "all forms of experimentation for scientific research" would be considered expressive under the first amendment.[62] Individual experiments would then be subjected to the various balancing tests, such as the *O'Brien* approach,[63] that the Court employs for determining the legitimacy of regulations affecting expressive conduct.[64] The problem with relying on *O'Brien* balancing is twofold. First, if all experimentation is regarded as pos-

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[55] Emerson testimony, *supra* note 2, at 879.

[56] I. CARMEN, *supra* note 2, at 39.

[57] *Id.* at 40; *see also* Delgado & Millen, *supra* note 2, at 377 n.181, 379-80 (suggesting that scientific research should be treated as expressive conduct).

[58] Robertson, *Scientist's Right, supra* note 2, at 1240.

[59] *Id.*

[60] *Id.* at 1254.

[61] *See, e.g.,* Favre & McKinnon, *supra* note 2, at 671 n.69 (arguing that experimentation is a necessary incident of speech, citing cases including Spence v. Washington, 418 U.S. 405 (1974), and Tinker v. Des Moines Indep. Community School Dist., 393 U.S. 503 (1969)); Ferguson, *Scientific Inquiry, supra* note 2, at 651-54 (noting that experimentation may be noncommunicative and yet protected by Buckley v. Valeo, 424 U.S. 1 (1976), which explicitly referred to financial expenditures as "speech"). *But see* Delgado, *Race-IQ Research, supra* note 2, at 161 ("Research activities do not ordinarily constitute intentional communications of information from a research scientist to an audience. Therefore, the symbolic speech analysis offers only minimal support for protecting scientific research.").

[62] *See* Emerson testimony, *supra* note 2, at 887.

[63] *See supra* text accompanying note 19.

[64] *See* Emerson testimony, *supra* note 2, at 887.

sessing prima facie constitutional protection, then courts would be required to subject *every* regulation of experimentation to first amendment scrutiny. This higher level of scrutiny would require that courts explore on a case-by-case basis the alleged benefits and risks of experimentation. Second, the legislature might decide that particular activities were amenable to regulation in "research" contexts but not in other contexts. If experimentation is accorded prima facie protection under the first amendment, such an "overnarrow" regulation would raise problems under *O'Brien*.[65]

Whether the general view as articulated by Professor Emerson of the broad scope of "orthodox" first amendment protection has ever been true is not clear. Even assuming that such an assessment of the past is correct, however, the Court's recent decision in *Clark v. Community for Creative Non-Violence*[66] raises a serious question that courts would accord prima facie first amendment protection to "all forms of experimentation." The general view predicates the characterization of the conduct of experimentation as expressive for first amendment purposes by asserting that such conduct facilitates expression. The decision in *Clark,* despite some suggestion by theorists of the general view that conduct can be protected as "speech plus" or as "expressive conduct" insofar as the conduct facilitates speech, indicates that facilitative conduct can be and is distinguished from expressive conduct.

In *Clark,* the National Park Service issued a renewable seven-day permit to the Community for Creative Non-Violence (CCNV) to conduct a demonstration on the Mall and in Lafayette Park in Washington, D.C. The stated purpose of the demonstration, which was to begin on the first day of winter, was to "impress upon the Reagan Administration, the Congress, and the public the plight of the poor and the

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[65] For example, *O'Brien* required that the government interest expressed in regulations must be unrelated to the suppression of free expression. *O'Brien,* 391 U.S. at 377. One indication that the governmental interest is related to suppression of speech is when the regulation affects conduct only in those instances when the conduct is expressive. Assume that experimentation is considered to be expressive and that the government regulates the use of electrical shocks applied to animals in experiments. Assume further that the government does not prohibit the use of shocks delivered by cattle prodders used in slaughterhouses. The experimenter may argue that, although the government claims that its only interest is animal welfare, the government is regulating conduct (electrical shocks) only when the conduct occurs in an expressive context and not when it occurs in a nonexpressive context. Perhaps the answer is that even if the first amendment protects experimentation, the legislature is not required to eradicate all evils at the same time. *See, e.g.,* City of Renton v. Playtime Theatres, Inc., 106 S. Ct. 925, 931-32 (1986) (rejecting argument that city ordinance regulating adult theaters was "underinclusive" because it failed to regulate other adult businesses likely to produce secondary effects similar to those produced by adult theaters).

[66] 468 U.S. 288 (1984).

homeless."[67] The Park Service permit allowed CCNV to erect two symbolic "tent cities" and to maintain a twenty-four hour presence at the sites but denied the CCNV request that demonstration participants be permitted to sleep in the tents because regulations prohibited sleeping as part of a general prohibition of camping. CCNV sought to enjoin the application of the camping prohibition on a number of grounds, including first amendment protection of the sleeping as expressive conduct. The district court granted the government's motion for summary judgment, and the court of appeals (en banc) reversed.[68] The Court subsequently reversed the court of appeals.

The court of appeals held that the Park Service regulations had been improperly applied to the CCNV demonstrators. There was, however, no opinion for the court: the six judges who voted for reversal produced four different opinions and the five dissenters produced two opinions. Much of the debate in the court of appeals focused on an implicit tension between the analysis of expressive and facilitative conduct. This tension was caused by ambiguity in the CCNV position, which vacillated between portraying sleeping as an integral part of its demonstration and portraying sleeping as a "facilitative" or "functional" activity that made the demonstration possible or more successful.[69]

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[67] Community for Creative Non-Violence v. Watt, 703 F.2d 586, 587 (D.C. Cir. 1983) (en banc) (Mikva, J.), *rev'd sub nom.* Clark v. Community for Creative Non-Violence, 468 U.S. 288.

[68] *See id.* at 586-87.

[69] Judge Mikva, joined by Judge Wald, reasoned that sleeping by CCNV satisfied the test set out in Spence v. Washington, 418 U.S. 405 (1974), *see infra* note 73, in that CCNV clearly intended to express and to communicate a particularized message about the homeless and that the context of the demonstration made it likely that those who observed the CCNV sleeping would understand the political message that CCNV sought to convey. Nevertheless, Judge Mikva made several comments that suggested his willingness to extend first amendment protection to sleeping even if it did not meet the *Spence* test. First, he noted that CCNV indicated that sleeping would serve both an expressive role and a facilitative role in making "it possible for the homeless to attend." *Community for Creative Non-Violence,* 703 F.2d at 593 n.16. (Mikva, J.). He stressed that the burden on the CCNV demonstrators to prove that the conduct was expressive was limited to their "advancement of a plausible contention that their conduct is intended to, and in the context of their demonstration likely will, express a message," *id.* (Mikva, J.) and rejected the government's argument that CCNV failed to show that the conduct was expressive, *id.* at 593 n.16 (Mikva, J.).

Second, Judge Mikva rejected CCNV's contention that sleeping deserved first amendment protection because it directly expressed the message of homelessness, *id.* at 594 (Mikva, J.), and suggested that sleeping would be protected by "all those who wish to engage in sleeping as part of their demonstration and have been granted renewable permits to demonstrate on a twenty-four hour basis on sites at which they have also been allowed to erect temporary symbolic structures," *id.* at 596 (Mikva, J.). Judge Mikva characterized the sleeping as either expressive conduct or facilitative conduct, applied the relevant balancing tests, and concluded that the regulation, as applied to

The Court, in an opinion by Justice White, reversed the court of

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CCNV, failed to further the governmental interests expressed. Chief Judge Robinson and Judge Wright concurred in Judge Mikva's opinion, except that portion providing protection to sleeping as facilitative, rather than as expressive, conduct. *Id.* at 600 (Robinson, C.J., concurring). Judge Edwards, also concurring, indicated that he was "troubled" by how CCNV alternatively characterized its activity as expressive and facilitative, *id.* (Edwards, J., concurring), stating that although it was "undeniably true that the [CCNV] sleeping is in part facilitative," *id.* at 601 (Edwards, J., concurring), the sleeping was itself expressive conduct under *Spence.* Although the regulation did not satisfy Judge Edwards's understanding of relevant balancing tests, he made clear that he would not extend protection to sleeping that was "wholly facilitative." *Id.* (Edwards, J., concurring).

Judge Ginsburg's concurrence in the judgment contained a relatively detailed analysis of the distinction between expressive and facilitative conduct. She indicated concern that CCNV had at times acknowledged that the sleeping was noncommunicative. According to Judge Ginsburg, the sleeping was not like a "soap box speech, leaflet distribution, protest march, armband or flag display," *id.* at 606 (Ginsburg, J., concurring in the judgment), because even in the context of the demonstration, sleeping was not a "comprehensible form of expression." *Id.* at 607 n.11 (Ginsburg, J., concurring in the judgment) (quoting Henkin, *supra* note 49, at 80). It was "not designed '100%' as expression." *Id.* at 606 (Ginsburg, J., concurring in the judgment) (quoting Ely, *supra* note 48, at 1495; *see infra* note 81). "It has a more commonly recognized aspect; sleep enables the round-the-clock demonstrator to face the next day without exhaustion." *Id.* at 606-07 (Ginsburg, J., concurring in the judgment) (footnote omitted). Judge Ginsburg nevertheless extended protection to the sleeping explicitly on the basis of its facilitative, and not communicative, nature because sleeping allowed the demonstrators to continue their protest. *See id.* at 607 (Ginsburg, J., concurring in the judgment). Judge Ginsburg recognized that the sleeping might be considered expressive, but to that extent was "speech plus," or "conduct designed both to speak and to accomplish a more readily or commonly comprehended non-communicative purpose." *Id.* at 607 n.12 (Ginsburg, J., concurring in the judgment). She distinguished her use of "speech plus" from "expressive activity 'with collateral consequences that invite[] regulation.'" *Id.* (Ginsburg, J., concurring in the judgment) (quoting Kalven, *supra* note 49, at 23).

Judge Wilkey's dissent argued that even if sleeping were expressive, the government regulations satisfied applicable tests. However, he explicitly rejected the notion that noncommunicative conduct that facilitates expression should be subjected to first amendment analysis. Judge Wilkey was joined by Judges Tamm, MacKinnon, Bork, and Scalia. Judge Wilkey argued that the Court had not provided guidance as to what conduct beyond marching and picketing qualified as "speech." He suggested that all conduct might be considered speech for purposes of "avoiding a proscription specifically designed to suppress expressive communication" and that "traditional" communicative activities, such as picketing, should be protected from general prohibitions not directed at communicative conduct. *Id.* at 613 (Wilkey, J., dissenting) (footnote omitted); *see infra* note 85.

Judge, now Justice, Scalia wrote separately to express the view that the first amendment does not protect conduct that facilitates expression: "Otherwise it would have been unnecessary to address 'freedom of the press' separately—or, for that matter, 'freedom of assembly,' which was obviously directed at facilitating expression." *Id.* at 622 (Scalia, J., dissenting). Judge Scalia was joined by Judges MacKinnon and Bork. Judge Scalia proposed a two-step inquiry based on his view that the first amendment protects only spoken and written communication. If laws inhibit this protected spoken and written communication, then the laws are invalid even if they are directed at activities such as campaign contributions, sound amplification, or littering. If laws prohibit conduct generally and only inhibit nonspoken or nonwritten communication, then they are subject only to minimal scrutiny unless they single out the communicative aspects of conduct for regulation. *Id.* at 623 (Scalia, J., dissenting).

appeals. The Court assumed that the sleeping was expressive but explicitly disagreed with a view expressed by the court of appeals that CCNV merely had to advance "a plausible contention that their conduct was expressive."[70] Rather, the Court held that "[a]lthough it is common to place the burden upon the Government to justify impingements on First Amendment interests, it is the obligation of the person desiring to engage in assertedly expressive conduct to demonstrate that the First Amendment even applies."[71] Such demonstration requires that

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Judge Scalia's dissent, however, is inconsistent because he also recognized the validity of cases where laws improperly prohibit an "essential concomitant of effective speech." *Id.* (Scalia, J., dissenting). Judge Scalia thought it self-evident that sleeping was not an "essential concomitant" of the CCNV demonstration. *Id.* (Scalia, J., dissenting). Even though Judge Scalia seemed to suggest that "an essential concomitant of effective speech" need not be communicative, the conduct he would protect would be characterized as expressive under prevailing theory. *Id.* (Scalia, J., dissenting).

Judge Scalia discussed sound amplification, *see* Saia v. New York, 334 U.S. 558 (1948), campaign contributions, *see* Buckley v. Valeo, 424 U.S. 1 (1976), demonstrating, *see* Cox v. Louisiana, 379 U.S. 559 (1965); Cameron v. Johnson, 390 U.S. 611 (1968), and labor picketing, *see* Amalgamated Food Employees Union Local 590 v. Logan Valley Plaza, Inc., 391 U.S. 308 (1968). In *Saia,* the Court held that the use of voice amplifiers could be regulated by the state, but not through an ordinance that gave "uncontrolled discretion" to the chief of police. 334 U.S. at 560. The Court characterized the voice amplifier as an "indispensable instrument[] of effective public speech." *Id.* at 561. It is clear, however, that the use of a voice amplifier is more like shouting or engaging in verbal expression than like engaging in noncommunicative conduct that "essentially facilitated" speech. In *Buckley,* a case a number of commentators rely on as support for the first amendment protection of experimentation, *see, e.g.,* Ferguson, *Scientific Inquiry, supra* note 2, at 652 (suggesting that "since limitations on spending restrict the exercise of the free speech right, the expenditure of money for political speech must itself be protected as a first amendment freedom"); Robertson, *Scientist's Right, supra* note 2, at 1218 n.59 (arguing that when the Court is faced directly with governmental restraint on scientific acquisition of data from a willing source, *Buckley* supports the constitutionally protected status of research), the Court explicitly refused to characterize the campaign contributions as conduct and characterized them instead as pure expression. *Buckley,* 424 U.S. at 16-17; *see also* Baker, *Realizing Self-Realization: Corporate Political Expenditures and Redish's* The Value of Free Speech, 130 U. PA. L. REV. 646, 650 (1982) ("Virtually any first amendment theory would conclude that an individual's use of her resources to make or sponsor political communications is speech for first amendment purposes." (footnote omitted)). Both demonstrating and labor picketing involve physical activity that is itself nonverbal expression.

[70] *Clark,* 468 U.S. at 293 n.5 (citing Community for Creative Non-Violence v. Watt, 703 F.2d at 593 n.16.

[71] *Id.* This pronouncement reflects a general trend by the Court to require litigants to demonstrate that the government action actually burdens constitutionally protected rights before the Court will apply heightened scrutiny. *See, e.g.,* City of Akron v. Akron Center for Reproductive Health, 462 U.S. 416, 462 (1983) (O'Connor, J., dissenting) (noting that "[t]he requirement that state interference 'infringe substantially' or 'heavily burden' a right before heightened scrutiny is applied is not novel in our fundamental-rights jurisprudence"); San Antonio Indep. School Dist. v. Rodriguez, 411 U.S. 1, 37-38 (1973) (observing that "strict judicial scrutiny" has been applied by the Court only when legislation may be said to have " 'deprived,' 'infringed,' or 'interfered' with the free exercise of some such fundamental personal right or liberty" (citations omitted)).

the litigant satisfy the test set out in *Spence v. Washington*,[72] which required an intention to communicate in a context in which actual or potential observers would understand the message sought to be conveyed.[73] The Court noted that, although it assumed that the sleeping by CCNV was expressive, "it is evident that its major value to [the] demonstration would be facilitative."[74] The clear implication of the Court's characterization of the activity left little doubt that purely facilitative

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[72] 418 U.S. 405 (1974).

[73] *See Clark*, 468 U.S. at 294 ("[A] message [protected by the first amendment] may be delivered by conduct that is intended to be communicative and that, in context, would reasonably be understood by the viewer to be communicative." (citing Spence v. Washington, 418 U.S. at 410)).

The Court in *Spence* overturned a conviction (under a Washington state statute that prohibited, among other things, exhibiting a marked-up American flag) for displaying a flag with a peace symbol affixed to it. It was undisputed that the appellant "wanted people to know that I thought America stood for peace." *Spence*, 418 U.S. at 408. The Court found this flag-flying to be expressive conduct protected by the first amendment. *Id.* at 410. It noted that:

> [Following the] Cambodian incursion and the Kent State tragedy, . . . [a] flag bearing a peace symbol and displayed upside down . . . was . . . a pointed expression of anguish . . . . An intent to convey a particularized message was present, and in the surrounding circumstances the likelihood was great that the message would be understood by those who viewed it."

Id. at 410-11.

Although the distinction between "speech" and "conduct" is elusive, *see supra* notes 48-49, *Spence* applies to expressive conduct. If a litigant wishes to invoke first amendment protection for conduct, it is necessary to satisfy *Spence*. Speaking and writing are clearly expression, so nothing in *Clark* would suggest that the litigant would have to satisfy *Spence* before the first amendment was implicated. Indeed, application of *Spence* to what is clearly expression, such as writing, would lead to bizarre results. For example, the writer of a book or article often produces initial drafts that she either does not intend to be perceived by others or intends to be perceived only at some later time. But no one would doubt that the government could not regulate the production of "first drafts" without satisfying the tests for regulating expression.

[74] *Clark*, 468 U.S. at 296. Chief Justice Burger concurred in the opinion but emphasized that the sleeping was conduct and not speech. *See id.* at 300 (Burger, C.J., concurring in the judgment).

In dissent, Justice Marshall argued that the conduct was expressive and that, although the majority assumed that the conduct was expressive, it did not take the assumption seriously precisely because of the view that the conduct was also facilitative. Justice Marshall, in addition to emphasizing the expressive nature of the conduct, argued that "facilitative conduct that is closely related to expressive activity is itself protected by First Amendment considerations." *Id.* at 310 n.7 (Marshall, J., dissenting).

Both the majority and dissent argued that the standard in *O'Brien* and the standard for judging time, place, and manner restrictions were the same. *Id.* at 298 n.8; *id.* at 308 n.6 (Marshall, J., dissenting). Justice Marshall argued, however, that recent applications of these tests by the Court had resulted in a "two-tiered" approach: "[W]hile regulations that turn on the content of the expression are subjected to a strict form of judicial review, regulations that are aimed at matters other than expression receive only a minimal level of scrutiny." *Id.* at 313 (Marshall, J., dissenting) (footnote omitted). This two-tiered approach reflects in substantial degree the framework urged by Judge Scalia. *See supra* note 69.

conduct, not itself communicative, would not be protected. The Court concluded that the prohibition on sleeping was justified either as a permissible time, place, or manner restriction or as a reasonable restriction on expressive conduct.

The problem in *Clark* was that, to some degree, CCNV had characterized its sleeping activity as noncommunicative facilitative conduct necessary for the success of its demonstration.[75] Although "conduct" receives protection under the first amendment, the conduct must be expressive. Sometimes that conduct is itself a vehicle for expression, such as wearing an armband or burning a draft card. Sometimes that conduct may not normally be a vehicle for expression, such as walking, but walking as part of a demonstration is itself clearly expressive. In all cases, however, the conduct may be said to "facilitate" expression or to serve in a "functional" relation to that communication. When a student wears an armband, the expression involved may be opposition to war, and the armband facilitates the expression. But the armband is expressive in itself. When a protestor carries a sign in a demonstration, the expression is printed on the sign and marching facilitates the expression. But the presence of the marcher in the demonstration is expressive in itself. Finally, the conduct may be protected by the first amendment as associational activity that includes political organization necessary for political speech.[76]

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[75] *See Clark,* 468 U.S. at 310 (Marshall, J., dissenting). Professor Baker points out the "delicate, practical problem of distinguishing" those for whom sleeping is expressive and those for whom it is not. Baker, *Unreasoned Reasonableness: Mandatory Parade Permits and Time, Place, and Manner Regulations,* 78 NW. U.L. REV. 937, 975 (1983) (footnote omitted). Professor Baker concludes that "[p]roper recognition of the constitutional right, however, means that the difficulty of making the distinction between protected and unprotected camping cannot justify denying the right." *Id.; see also* Easterbrook, *The Supreme Court, 1983 Term—Foreword: The Court and the Economic System,* 98 HARV. L. REV. 4, 20-21 (1984) (asking "how complex patterns of behavior would change if sleeping were permitted" in *Clark*); Tribe, *Constitutional Calculus: Equal Justice or Economic Efficiency?,* 98 HARV. L. REV. 592, 599-601 (1985) (stating that if sleeping were not permitted, "bag ladies and other destitute and homeless people would not be drawn to the site"). *But see* Easterbrook, *Method, Result and Authority: A Reply,* 98 HARV. L. REV. 622, 626 (1985) (explaining how there would be competition for the benefits of the redistribution of valuable goods—the right to sleep in the park).

[76] The Court has recognized the right to "engage in association for the advancement of beliefs and ideas." NAACP v. Alabama, 357 U.S. 449, 460 (1958); *see also* Brown v. Socialist Workers '74 Campaign Comm. (Ohio), 459 U.S. 87, 91 (1982) (stating that "[t]he Constitution protects against the compelled disclosure of political associations and beliefs"); NAACP v. Button, 371 U.S. 415, 430 (1963) (affirming a right to associate for the purpose of advancing beliefs and ideas); Shelton v. Tucker, 364 U.S. 479, 487 (1960) (explaining that the fourteenth amendment limits the power of the states to interfere with freedom of speech, freedom of inquiry, and freedom of association). Association is not protected merely because it facilitates speech, but also because it is predicated "upon the close nexus between the freedoms of speech and

Although the sleeping in *Clark* most likely qualified as expressive conduct under any theory and probably should have been protected given the lack of any coherent justification for its prohibition, there was some concern, caused by CCNV's inconsistent position, that the sleeping was intended more to facilitate the demonstration than to be a part of its expression. That possible lack of expression should give any good marketplace theorist serious cause for concern. The marketplace theory seeks to assure a free flow of information for public and private decisionmaking and for the revelation of truth.[77] As such, marketplace theory emphasizes that "expression has special value only in the context of 'dialogue': communication in which the participants seek to persuade, or are persuaded; communication which is about changing or maintaining beliefs, or taking or refusing to take action on the basis of one's beliefs."[78] Most marketplace theorists rely on the content of verbal or nonverbal expression insofar as the speaker intends "to communicate to one or more persons some proposition or attitude."[79] Depending on the theorist, the category of "expressive acts" protected by the marketplace model may be "an extremely broad class. In addition to many acts of speech and publication it includes displays of symbols, failures to display them, demonstrations, many musical performances, and some bombings, assassinations, and self-immolations."[80] Nevertheless, "as an irreducible minimum [protectable expression] must constitute a communication."[81]

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assembly." *Alabama,* 357 U.S. at 460. Association is "an inseparable asset of the 'liberty' assured by the Due Process Clause of the Fourteenth Amendment, which embraces freedom of speech." Id.

In the specific context of research, Professor Robertson argues that research involves association both in terms of association with research subjects and with other researchers. *See* Robertson, *Scientist's Right, supra* note 2, at 1214-15. Robertson observes that "[t]he argument for research as association, however, may add little to an argument for research as a constitutional right, because its protection as a form of association depends on the recognition of research as a speech or expressive activity." *Id.* at 1215.

[77] *See supra* notes 38-46 and accompanying text.

[78] L. TRIBE, *supra* note 13, § 12-8.

[79] Scanlon, *A Theory of Freedom of Expression,* 1 PHIL. & PUB. AFF. 204, 206 (1972); *see also* Note, *Symbolic Conduct,* 68 COLUM. L. REV. 1091, 1113-14 (1968) (arguing that conduct not calculated to communicate does not aid the free exchange of ideas).

[80] Scanlon, *supra* note 79, at 206; *see also* Baker, *supra* note 75, at 992 (explaining how walking in small, organized groups constituted "moving assemblies" done for expressive purposes).

[81] M. NIMMER, *supra* note 48, § 3.06[C]. Whether the marketplace theorist focuses on the behavior of the actor to ascertain if the actor intends to communicate, *see* Note, *supra* note 79, at 1109-13, or, alternatively, focuses on "whether the harm that the state is seeking to avert is one that grows out of the fact that the defendant is communicating," Ely, *supra* note 48, at 1497, the broadest scope of protection under

The Court in *Clark,* by refusing to consider that "all conduct is presumptively expressive,"[82] emphasized the importance of the initial characterization of an activity for first amendment analysis under prevailing "balancing approaches," as well as under "absolutist" positions such as that of Professor Emerson. Moreover, if the litigant cannot satisfy the threshold showing required by *Clark* that *the litigant* intended to communicate and that others would recognize the conduct as communicative, then it is doubtful that the Court instead would allow the litigant to argue that the state was attempting to regulate what it viewed as an undesirable communication, irrespective of the litigant's intentions.[83]

Many instances of experimentation would, even after *Clark,* be accorded at least prima facie protection by the first amendment because much experimentation, or data gathering, especially but not exclusively in social sciences, involves communication.[84] But if the particular experimental context lacks independently communicative aspects, then there is nothing inherent in that context that makes conduct expressive merely because it is *facilitative.* The experimenter may regard the experimental activity as necessary to the completed research project, and

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the marketplace theory is limited to verbal or nonverbal acts that are expressive in that they are communicative.

Professor Ely argues that no distinction may be made between protected expression and unprotected action, as Professor Emerson suggests, because, for example, "[b]urning a draft card to express one's opposition to the draft is an undifferentiated whole, 100% action and 100% expression." *Id.* at 1496. Professor Ely concludes that attempts to distinguish expression from action "inevitably degenerate into question-begging judgments about whether the activity should be protected." *Id.* at 1495. Professor Ely approves of the approach in *O'Brien* and focuses attention on whether the state asserts an interest causally connected to the communicative significance of the conduct. Professor Ely does not discuss whether the conduct could be characterized as communicative apart from the *state*'s assertion that its interest was implicated by communicative elements. Professor Ely's framework may be insufficient because it would not even be triggered until it was determined that *O'Brien* applied, that is, until it was determined that the conduct was communicative. Professor Ely does not discuss what framework should be used to make this threshold determination. Professor Henkin argues that if nonverbal expression "is intended as expression, if in fact it communicates, especially if it becomes a common comprehensible form of expression, it is 'speech.'" Henkin, *supra* note 49, at 80.

[82] *Clark,* 468 U.S. at 293 n.5.

[83] *See supra* note 81. In a personal communication, Professor Baker has suggested the following example. Assume that a homeless person who did not intend to communicate her plight and merely intended to sleep, reclined and slept on a park bench in violation of an ordinance against such sleeping. Assume further that the authorities decided to enforce the ordinance and remove her from the bench because her presence "communicated" something undesirable about the city's lack of provision of social services. Under Professor Ely's approach, it would seem that the city's action would trigger serious concerns under *O'Brien,* but it is unlikely, especially after *Clark,* that the first amendment would even be implicated.

[84] Robertson, *Scientist's Right, supra* note 2, at 1217.

in a *functional* sense, the activity may relate to the communication of the ultimate research as marching relates to a demonstration. But the experimenter is without grounds under marketplace theory to argue that the conduct is *expressive* simply because it is essential to the research. If the conduct cannot itself be considered expressive, then its *facilitative* nature does not make it *expressive*. Regulation of experimental activities for purposes other than suppression of the ultimate communication by the experimenter simply would not involve the regulation of expressive conduct.[85]

A recent court of appeals case indicates that the experimental context does not per se contain communicative elements. In *Dow Chemical Co. v. Allen*,[86] experimenters at the University of Wisconsin were conducting toxicity studies of a herbicide by feeding the substance to rhesus

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[85] In his dissent in Community for Creative Non-Violence v. Watt, 703 F.2d 586 (D.C. Cir. 1983), *rev'd sub nom.* Clark v. Community for Creative Non-Violence, 468 U.S. 288 (1984), Judge Wilkey suggested that courts might consider all conduct to be "speech" or "speech plus" for the purpose of avoiding proscriptions specifically designed to suppress ultimate communication. *Id.* at 613 (Wilkey, J., dissenting); *see supra* note 69. Even if Judge Wilkey's suggestion were adopted, regulation of research on the ground that the state had an interest in public welfare and not in suppressing the dissemination of communication obviously would not suffice to justify treating experimentation as "speech plus."

There is certainly a sense in which the general view regards experimentation as indistinguishable from the ultimate dissemination of the information to others in the form of publication. Professor Robertson's analysis most notably reflects this concern, maintaining that "a system that protects only dissemination of existing messages would enable government to restrict drastically the flow of information by merely restricting activities that are prior to and indispensable for publication." Robertson, *Scientist's Right, supra* note 2, at 1217. This approach poses difficulty because it assumes that all experimentation is ultimately linked to publication of the results of that experimentation, or at least the communication of results to others in a firm or government bureaucracy. That assumption may be incorrect because many experiments have results that do not demonstrate any effect, are performed using poor technique, or involve trivial problems, and may never be published or communicated. Professor Robertson attempts to address this concern by stating that such research should still be protected for two reasons: "[F]irst, the free speech interest in self-expression exists independently of dissemination. Second, the dangers of predicting incorrectly which research will lead to dissemination are too great to foreclose any research from protected status." *Id.* at 1218 n.57. Professor Robertson's reliance on self-expression reflects a nonmarketplace first amendment concern that is otherwise inconsistent with his marketplace theory of protection. Professor Robertson's second reason would lead him to uphold protected status even if only a very small amount of experimentation resulted in publication and the remainder of the activity was trivial or done with poor technique. This seems to undercut his general argument emphasizing the free flow of useful social information that results from experimentation.

[86] 672 F.2d 1262 (7th Cir. 1982). The Seventh Circuit has ostensibly weakened *Allen* in its more recent decision in Dietchman v. E.R. Squibb & Sons, Inc., 740 F.2d 556 (7th Cir. 1984) (holding that a drug company may discover uncompleted research despite claims by the researcher that such discovery would jeopardize his first amendment rights).

monkeys in varying quantities and at different levels of concentration.[87] The study was funded by the federal government and was performed pursuant to federal testing requirements.[88] After the experimenters completed part of the study and released the results to the Environmental Protection Agency (EPA), the EPA suspended certain uses of herbicides manufactured by Dow. Dow subsequently sought information from the researchers regarding portions of their tests that were not yet completed.[89] The circuit court denied enforcement of the subpoenas because of, inter alia, the academic freedom of the experimenters, an issue that had been raised for the first time on appeal by the state of Wisconsin as amicus.[90] After discussing the concept of academic freedom generally, the court expressed its concern that "inadvertent disclosure of the subpoenaed data could jeopardize both the studies and [the] careers [of the experimenters]."[91] The court reflected the same concern when it discussed the burden of compliance with the subpoena and noted that "peer review and publication of the studies [were] crucial to the researchers' credibility and careers and would be precluded by whole or partial public disclosure of the information."[92]

Analyzing the *Allen* case, Professor O'Neil argues that the notion of academic freedom requires that academic researchers have some immunity from subpoenas to protect the confidentiality of source relationships and to shield the researcher as well as the research subject's "right to speak anonymously and without fear of reprisal."[93] Professor O'Neil recognizes that the research in *Allen* did not "fit the mold" of confidentiality of communication "[u]nless one extends to rhesus monkeys a comparable solicitude"[94] concerning source anonymity. But, according to Professor O'Neil, researchers in the natural and physical sciences could claim a different interest, implicit in the *Allen* case, to shield themselves from subpoenas—that during the process of data gathering, experimenters do not speak or seek to communicate findings and "[t]he very nature of research presupposes ample opportunity for

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[87] *Allen,* 672 F.2d at 1266.

[88] *Id.* at 1279 (Pell, J., concurring).

[89] *Id.* at 1266.

[90] *Id.* at 1274-75.

[91] *Id.* at 1276. Judge Pell did not join the opinion since it concerned the academic freedom issue, an issue that was not raised below and was not necessary for the decision. He also added that he was troubled by applying the doctrine of academic freedom when the research was "not an independent investigation engaged in by faculty researchers and financed by the University" and was instead "financed by government money." *Id.* at 1279 (Pell, J., concurring).

[92] *Id.* at 1273.

[93] O'Neil, *supra* note 2, at 849.

[94] *Id.* at 850.

testing and validation. Compelling the revelation of preliminary findings of raw research data . . . poses great risk for the careful scientist."[95]

The experimental context described by Professor O'Neil is inherently noncommunicative. Although that does not mean that communication could not transpire in that context, if a particular activity is not itself communicative, then nothing about the experimental context transforms it into a communication.[96] In many respects, Professor

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[95] *Id.*

[96] With regard to the suggestion that experimentation, even though not itself involving communicative elements, may be protected by "academic freedom," it should be noted that neither the court in *Allen* nor Professor O'Neil thought that the experimentation at issue was "speech" or expressive conduct. Professor O'Neil maintains that the court in *Allen* "did not treat the [subpoena] as a direct or even potential suppression of speech, but rather as the indirect constraint which it was." O'Neil, *Academic Freedom and the Constitution,* 11 J.C. & U.L. 275, 284 (1984). The problem is that, even assuming that the first amendment protects "academic freedom" in some sense, the protection has never been extended in the way that Professor O'Neil suggests that it should be.

The Court has mentioned "academic freedom" in a number of cases. *See, e.g.,* Regents of the Univ. of Mich. v. Ewing, 106 S. Ct. 507, 514 (1985) (mentioning a "reluctance to trench on the prerogatives of state and local education institutions" while voicing an awareness of a "responsibility to safeguard their academic freedom"); Regents of the Univ. of Cal. v. Bakke, 438 U.S. 265, 311-13 (1978) (opinion of Powell, J.) (observing that "[a]cademic freedom, though not a specifically enumerated constitutional right, long has been viewed as a special concern of the First Amendment"); Keyishian v. Board of Regents, 385 U.S. 589, 603-04 (1967) (stating that "[o]ur nation is deeply committed to safeguarding academic freedom"); Sweezy v. New Hampshire, 354 U.S. 234, 250 (1957) (stating that the areas of academic freedom and political expression are ones "in which government should be extremely reticent to tread"). But the "cases in which the doctrine was found were not decided solely on this ground. . . . [T]he restraints involved teaching, either directly or indirectly. As teaching primarily involves speech, traditional restraints on curbing speech have come into play . . . ." Comment, *supra* note 2, at 1430-31. There has as yet been no "academic freedom" decision that could not be explained on traditional first amendment grounds. Moreover, it would be highly artificial to distinguish for constitutional purposes between experimentation conducted in an academic setting and experimentation conducted elsewhere. The same experiment may be done by a government employee working at a government agency, by an academic performing the experiment under contract with the government or a private corporation, or by a private corporation or research center. The setting of the experiment should not make a difference. For an interesting discussion of the relationship between the biotechnology industry and universities, see OFFICE OF TECHNOLOGY ASSESSMENT, COMMERCIAL BIOTECHNOLOGY: AN INTERNATIONAL ANALYSIS (1984). Chapter 17 of the study concerns "University/Industry Relationships" and appendix H presents "selected aspects" of these relationships. It should also be noted that academic institutions are not without motivation similar to that of industries. For example, a recent newspaper report indicated that a researcher at the University of California developed a "cancer-killing protein . . . possibly the most effective anti-tumor substance of its kind." *New Cancer-Killing Protein Is Touted by Researcher,* Phila. Inquirer, Feb. 15, 1986, at 5A, col. 1. The substance was apparently discovered "more than two years ago at the University of California at Irvine but was kept quiet while the university applied for a patent on the substance." *Id.* The patent statute has recently been amended to permit recipients of government funds to get pat-

O'Neil's observations reflect a first amendment concern that there is a right "*not* to speak publicly, one which serves the same ultimate end as freedom of speech in its affirmative aspect."[97] This concern, however, must relate to some notion of the first amendment as protecting individual liberty or self-expression, and not to marketplace theory.

2. Experimentation as Communication

There are at least five arguments that experimentation is protected expression apart from its status as expressive conduct in the traditional sense. These arguments, which are implicit in the objectivist characterization of science adopted by the general view,[98] involve experimentation as an information-generating event, experimentation as an expression of the "scientific method," experimentation as a public act, experimentation as an action of which others are aware, and experimentation as "basic" research. These arguments tend to some degree to emphasize more the *inherently* expressive nature of experimentation rather than the notion that the expressive nature of experimentation derives from its *facilitative* character.

a. *Information-Generating Events as Communication*

Professor Robertson offers an interesting variant of the "experimentation as communication" theory by elaborating on cases that establish the right of a willing listener to receive information from a willing speaker.[99] This right merely reflects that "[f]reedom of speech presupposes a willing speaker. But where a speaker exists . . . the protection afforded is to the communication, to its source and to its recipients both."[100] From this proposition, Professor Robertson makes two argu-

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ent protection that normally would have gone to the government. *See* 35 U.S.C. § 212 (Supp. III 1985).

[97] Pacific Gas & Elec. Co. v. Public Util. Comm'n, 106 S. Ct. 903, 909 (1986) (Powell, J., plurality opinion) (quoting Harper & Row v. Nation Enters., 471 U.S. 539, 559 (1985)); *see also* Wooley v. Maynard, 430 U.S. 705, 715-17 (1977) (holding that the first amendment right to refrain from speaking at all protected an individual's decision to cover New Hampshire's state motto, "Live Free or Die," on his license plate); West Virginia State Bd. of Educ. v. Barnette, 319 U.S. 624, 642 (1943) (holding that West Virginia violated the first amendment right to refrain from speech by compelling school children to salute the flag).

[98] *See infra* notes 233-69 and accompanying text.

[99] *See, e.g.*, Lamont v. Postmaster Gen., 381 U.S. 301, 305-07 (1965) (first amendment prohibits the government from requiring affirmative action from an addressee before she receives mailings that the Postmaster General has identified as "communist political propaganda"); Martin v. Struthers, 319 U.S. 141, 145-49 (1943) (first amendment prohibits a municipal ban on door-to-door distribution of literature when some residents may desire to receive the literature).

[100] Virginia State Bd. of Pharmacy v. Virginia Citizens Consumer Council, 425

ments. First, he argues that if the listener is a researcher, who is using the communication as data, the communication would still be protected.[101] Second, Professor Robertson states that "[w]hether the information that the scientists seek to acquire or receive already exists or remains to be developed through experimentation should have no constitutional significance."[102]

The first argument, that the communication is protected even if the listener is a researcher, is hardly controversial because "[i]n the classic marketplace model, the listener's right is a correlate of the speaker's."[103] The identity of the receiver is irrelevant. The second argument appears to maintain that the scientist has a right to "gather information," but because Professor Robertson argues that point separately, his argument about "receipt" should not be understood as a "gathering" argument. Professor Robertson analogizes the standard "receipt" situation to experimentation on the ground that "[i]n both cases researchers are seeking to acquire or receive information and ideas, and in both cases they must give the source a signal to begin the flow of information."[104] The right to receive information "logically entails" a decision "to acquire information through a particular communication from a willing speaker."[105] Professor Robertson thus appears to reduce experimentation to a situation where "manipulating or experimenting with willing collaborators or materials under their lawful control" is logically (and legally) a communicative event.[106]

Professor Robertson's argument would proceed as follows: if the listener has a right to listen to an assertion that the speaker makes, then the listener has a right to ask the speaker to make the assertion. If the listener can also ask the speaker to speak, then it should make no dif-

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U.S. 748, 756 (1976). In Board of Educ. v. Pico, 457 U.S. 853 (1982), a plurality of the Court held that the right to receive ideas "follows ineluctably from the *sender's* First Amendment rights to send them . . . [and] is a necessary predicate to the *recipient's* meaningful exercise of his own rights of speech, press, and political freedom." *Id.* at 867 (Brennan, J., plurality opinion). The plurality in *Pico* should not be read to support a right to receive information that is not correlated to the expressive activity of the speaker. In addition, those members of the Court who argued in *Pico* that the first amendment applied to analyze the propriety of the removal of books from a school library made it clear that no first amendment concern would be triggered in the absence of an intention by school officials to remove books in order to suppress ideas. *Id.* at 871 (Brennan, J., plurality opinion).

[101] *See* Robertson, *Scientist's Right, supra* note 2, at 1223.

[102] *Id.* at 1223-24.

[103] Baker, *supra* note 49, at 1006; *see also id.* at 1006 n.117 (citing cases which establish that the government cannot regulate speech in a way that would prevent a speaker from communicating with willing listeners).

[104] Robertson, *Scientist's Right, supra* note 2, at 1223.

[105] *Id.* (footnote omitted).

[106] *Id.*

ference whether the listener asks the speaker to tell the listener about the results of a toxicity test that the speaker did or the listener does the toxicity test herself. In both cases, Professor Robertson would argue, there is an information-generating communication.

Professor Robertson may be correct in asserting that when the experimenter engages in some communicative event in the course of data gathering, such as when a sociologist interviews a subject, the experimental context involves an information-generating communicative element.[107] Not *every* information-generating event, however, involves a communication. That freedom of speech entails the right to receive communications does not "logically entail"[108] that all information one receives is a communication. Moreover, to argue that experimenters have a right to receive information from "materials under their lawful control" begs the question as to whether experimenters have a right to control those materials in the first instance.[109]

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[107] Professor Robertson recognizes that social science will involve activities protected under traditional first amendment doctrine. *See supra* note 25 and accompanying text. But he also seems to think that social science research does not present as "compelling" a case for first amendment protection as does "basic research" or "scientific" research. *See* Robertson, *Scientist's Right, supra* note 2, at 1225 n.89.

[108] *Id.* at 1223.

[109] For example, Professor Robertson assumes that nonhuman "materials," a category that presumably includes nonhuman animals, are materials under the "lawful control" of experimenters for the purpose of "receiv[ing] information" from these animals. *See id.* at 1223. But that characterization begs the question. Anticruelty laws have long protected nonhuman animals from certain "uses" to which their owners might put them. As such, it is at least arguable that one of the sticks in the bundle of ownership of animals has been removed. Although in some sense nonhuman animals may be under the "lawful control" of experimenters, in another sense, they may not be.

Professor Robertson's theory is further marred by confusion concerning the method that he uses in determining the ambit of the right to receive information that supports first amendment protection for experimentation. Professor Robertson recognizes that, in some circumstances, willing listeners have not been permitted unfettered freedom to determine when to initiate the flow of communication. *See id.* at 1220. For example, he notes that although the Court in Stanley v. Georgia, 394 U.S. 557 (1969), recognized that freedom of speech protects the right of a listener to receive the speaker's spoken or written communication and held invalid a state law that punished private possession of obscene material, the Court has not recognized the listener's right to initiate the flow of obscene information in all circumstances. *See* Robertson, *Scientist's Right, supra* note 2, at 1220. In United States v. Thirty-Seven Photographs, 402 U.S. 363 (1971), the Court reversed a lower court decision that *Stanley* protected the importation of obscene photographs even when the claimant sought to use the photographs in an edition of *The Kama Sutra of Vatsyayana.* Arguably, the claimant was involved in the type of data collection that Robertson would call "research." Professor Robertson also recognizes that *Stanley* was limited by Miller v. California, 413 U.S. 15 (1973), and United States v. Reidel, 402 U.S. 351 (1971). *See* Robertson, *Scientist's Right, supra* note 2, at 1220 & n.68. Taken together, these cases support a restriction on the receipt of information. Professor Robertson dismisses these cases on two grounds. First, he states that *Stanley* only protects the "right of an individual to read in the privacy of his home." *Id.* at 1221. Robertson's reliance on *Stanley,* which does not rest on a

b. *Use of "Scientific Method" as Communication*

The second argument for the position that experimentation constitutes communication under marketplace theory is that the experimental context is inherently communicative. Performing an experiment constitutes communication, it is argued, in that it uses a system of symbols—the procedures of scientific "method"—that are commonly understood by other experimenters who may or may not be present.[110] But if use of the scientific method is sufficiently symbolic to constitute communication, then so is *any* rule-governed activity. Baseball is a rule-governed activity; however, it is doubtful that playing baseball is sufficiently communicative under normal circumstances to constitute expressive activity under marketplace theory. The same might be said for driving an automobile. The ambit of first amendment protection does not extend to every rule-governed activity.

c. *The Public Nature of Experimentation as Communication*

The third argument implicit in the general view is that experimentation is a "public" process whereby "truth" is gained through a method that is "witnessed," thus making the process inherently expressive. The experimenter expresses "truth"—confirming (or refuting) hypotheses—in front of witnesses.[111] While it is true that the formaliza-

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marketplace theory of the first amendment, is inconsistent from the outset with his general attempt to use marketplace notions to support protection for experimentation. Second, he contends that "other state interests were implicated in the distribution of obscene material." *Id.* Under Professor Robertson's general framework, preconditions to the right to receive must be protected. While various state interests enter the calculus, these interests are relevant only after the initial activity has been characterized as implicating first amendment concerns and weighed in the light of those important concerns. *See id.* at 1247-59; *infra* note 162.

The circularity here is apparent; Professor Robertson accepts that the first amendment is implicated when the state restricts the willing listener from receiving "communications" generated by willing speakers or materials under the control of the listeners. If the state so regulates, then heightened scrutiny is required and alleged state interests must be examined, except when other state interests are implicated so that the right to receive information may be limited from the outset. Professor Robertson's analysis, therefore, is confused about two issues: whether state interests are relevant to determine which conduct receives prima facie protection or whether they are relevant only when courts attempt to balance the competing interests of the state and the receiver of communication.

[110] Professor Robertson argues that scientific method is necessary to give meaning to scientific speech. *See* Robertson, *Scientist's Right, supra* note 2, at 1205 ("Freedom of scientific inquiry or research must . . . include the freedom to gather or generate data in ways that conform to scientific method.").

[111] As Professor Ferguson has noted:

> [A] system of free scientific expression promotes the discovery of scientific truth [by] provid[ing] an ever increasing fund of "public knowledge" that enables scientists to benefit from the work of colleagues. This is particu-

tion of experimentation in the seventeenth century had its origins in Boyle's demonstration of his air pump to others,[112] this characterization of experimentation does not play any significant role in modern science.[113] In virtually all experimental contexts, the notion of public "witnessing" has been transformed entirely to peer evaluation of expression contained in journals, and the public is otherwise excluded from the process.[114] The third argument, however, suffers from a more fundamental defect related to the earlier analysis of Professor Robertson's argument.[115] The fact that experimentation generates information does not mean that the individual experimenter intends to communicate information as required by marketplace theory. That experimentation generates information by itself does not support first amendment protection.

d. *The Awareness of Acting as Involving Communication*

The fourth argument, offered by Professor Baker, is that "[v]irtually all activities undertaken in a context where another will be aware of the activity communicate something."[116] But even assuming that many experiments are conducted before other people, Professor Baker's argument does not follow from his correct observation that "one can not easily identify communication activities."[117] Although in borderline cases the existence of communication is difficult to ascertain, there are also standard cases in which there would be general agreement that communication exists. Sometimes, what is apparently the same activity may be communication in one instance but not in another.

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larly significant in view of the corporate and collective nature of the scientific enterprise. Unlike art and other forms of human creativity, scientific achievements do not exist as separable entities, but are "parts of a single edifice that is collectively assembled by scientists."

Ferguson, *Scientific Expression, supra* note 2, at 540 (citation omitted); *see also* Ferguson, *Scientific Inquiry, supra* note 2, at 653 ("[S]cientific research is so essential to the ability of individuals to engage in scientific expression that limitations on the former must surely result in the abridgment of the latter.").

[112] *See* S. SHAPIN & S. SCHAFFER, LEVIATHAN AND THE AIR PUMP 4 (1985) ("Boyle's air pump experiments were designed to provide (and have since provided) a heuristic model of how authentic scientific knowledge should be secured.").

[113] Much experimentation, such as product testing, drug screening, product extraction, and standardization, has nothing whatsoever to do with hypothesis testing.

[114] S. SHAPIN & S. SCHAFFER, *supra* note 112, at 336 (noting that modern laboratories are, "as a practical matter, open only to 'authorized personnel.' ").

[115] *See supra* notes 99-109 and accompanying text.

[116] Baker, *supra* note 49, at 988. Professor Baker does not make this argument in the context of discussing experimental activity specifically, but Professor Baker's thesis is implicit in the general view. *See generally* Ferguson, *Scientific Expression, supra* note 2.

[117] Baker, *supra* note 49, at 988.

For example, if a person burns his draft card in the presence of another because he objects to conscription, the burning is clearly a communication. If a person burns his draft card in the presence of another to determine the intensity of heat required to ignite paper, that is clearly not intended as a communication. Sometimes the difference will turn on such elusive criteria as intention, but in many contexts, legal characterizations turn on such criteria.[118] There are difficult cases, but that difficulty does not mean that "intention" is a concept without content.

e. *Experimentation Incidental to "Basic Science" as Protected Expression*

Some commentators would limit first amendment protection of experimentation to that performed as part of "basic" research, as opposed to "applied" research or technology.[119] In some respects, this focus on basic research is not surprising: researchers typically predicate their rejection of government regulation of experimentation on the notion that basic science is "[p]ure science traditionally . . . defined as a method of investigating nature by the experimental method, seeking explanations with an aim of revealing the processes of natural phenomena."[120]

Much of what is designated as basic research is financed by the federal government. While funding mechanisms involve the government in the research process, the content and method of inquiry to some degree is left to the discretion of elite segments of the scientific community.[121] Government funding for what is designated as applied research

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[118] For example, to determine whether a statement is "hearsay" under the Federal Rules of Evidence, nonverbal conduct is judged to be a "statement" if "intended . . . as an assertion." FED. R. EVID. 801(a); *see also* C. MCCORMICK, MCCORMICK ON EVIDENCE § 246 (E. Cleary ed. 1984) ("[Rule 801's] definition must, therefore, be taken as meaning that out-of-court conduct that is not an assertion, or that, even though assertive, is not offered to prove the truth of the matter asserted, is not hearsay.").

[119] *See* I. CARMEN, *supra* note 2, at 150 (suggesting that while the first amendment protects "pure research" grants, "applied research funding . . . [for] experimentation which is prima facie nonacademic" may be subject to extensive government regulation); Delgado & Millen, *supra* note 2, at 403 (outlining elements which militate "in favor of protection of basic research").

[120] Furrow, *Governing Science: Public Risks and Private Remedies,* 131 U. PA. L. REV. 1403, 1415 (1983). Basic science is characterized by "an almost religious drive to 'know'." *Id.; see also* Goldberg, *Reluctant Embrace, supra* note 2, at 1350 ("The pure scientist pursues knowledge wherever it leads and for its own sake."). Professor Goldberg compares the "legal tolerance of basic research," *id.* at 1352-64, with legal restrictions on research applied to commercial products, *see id.* at 1364-79, and states that, "basic science operates free of the day-to-day judicial and political constraints common elsewhere in American society," *id.* at 1364.

[121] *See* Goldberg, *Reluctant Embrace, supra* note 2, at 1352-53; *see also* I. CARMEN, *supra* note 2, at 150 ("A principal understanding [among scientists] . . . is that when the government awards grants for pure research as the culmination of a rigorous

or technological development generally involves greater government participation in the actual research process.[122] The relative differences in the degree of government involvement in the scientific process have been exaggerated,[123] and some commentators have focused on these differences to develop separate frameworks for analyzing the constitutionality of restrictions on experimentation. For example, Professor Carmen, in his recent analysis of the regulation of DNA experimentation, seeks to distinguish basic research that is "a contribution to the marketplace of ideas"[124] and, therefore, protected by the first amendment, from unprotected applied research that only seeks to utilize what is already known and makes "a contribution to some other concern."[125] With respect to basic or "pure" research, which he considers primarily to be that research financed through federal grants, Professor Carmen argues that there is a *"constitutional duty"*[126] imposed upon the government to refrain from regulating scientific inquiry.[127]

There is, however, a tension within the general view with respect to the importance of a distinction between basic and applied research, and this tension manifests itself in two respects. First, not all commentators seek to confine first amendment protection to basic research.[128] Second, even those commentators who focus on basic research justify protection of scientific inquiry based, in part, on the alleged social im-

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peer review process, the money tendered must be used in fashions consistent with the givens of scientific inquiry."); *infra* note 353 (discussing funding of the National Institutes of Health).

[122] *See, e.g.*, I. CARMEN, *supra* note 2, at 150 ("Gene splicers endorse the conventional wisdom that grants [for pure research] are radically different from contracts, where NIH, say, can delineate goals, spell out procedures, and reserve all manner of prerogatives.").

[123] *See infra* note 353.

[124] I. CARMEN, *supra* note 2, at 41.

[125] *Id.*

[126] *Id.* at 150.

[127] Professor Carmen is not alone in his focus on the significance of basic research. Professor Goldberg argues that the first amendment protects scientific inquiry, but distinguishes between "basic research [where scientists] enjoy remarkable freedom," Goldberg, *Constitutional Status, supra* note 2, at 29, and "applied research, [where] government control is increased." *Id.* at 29 n.184. *Cf.* Goldberg, *Reluctant Embrace, supra* note 2, at 1350-52. Professor Delgado and Mr. Millen similarly limit first amendment protection to "original investigations for the advancement of scientific knowledge . . . which do not have specific [practical] objectives." Delgado & Millen, *supra* note 2, at 352 n.21 (quoting NATIONAL SCIENCE BOARD, SCIENCE INDICATORS 53 (1975)). Professor Delgado and Mr. Millen distinguish such "original investigations" from experiments that seek to apply information to solve practical problems, to construct various artifacts, or to develop skills to implement practical solutions. *Id.* at 352.

[128] For example, Professor Robertson maintains that "[a] right to research cannot, of course, be limited to basic research." Robertson, *Scientist's Right, supra* note 2, at 1225 n.89.

portance of the practical applications or technological advances of scientific inquiry.[129] Given the highly instrumental or consequential nature of the arguments for the protection of research,[130] the general view, unsurprisingly, finds it difficult to stop short of protecting applied research and technology, which directly relate to the "free flow of information for public and private decisionmaking."[131] Few private or public decisionmakers directly use the products of basic research in some way apart from their applied or technological manifestations.

How a focus on basic research relates to the first amendment is not apparent. Nothing inherent in basic research makes it more or less expressive under marketplace theory. Perhaps there is an underlying concern that the first amendment should protect the acquisition of knowledge represented by basic science as traditionally characterized, rather than protect applied science and technology that involves "conduct" or "activity" beyond the acquisition of knowledge.[132] If this concern for knowledge acquisition is relevant for first amendment pur-

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[129] Delgado & Millen, *supra* note 2, at 365. Professor Delgado and Mr. Millen appear at some points to limit the scope of protection to experiments that do not pose "tangible, content-related dangers to the social order." *Id.* at 380. Assuming that the nature of these dangers is clear, then it might be the case that the authors would extend protection to all "nondangerous" research, and not just what they label "basic research." This explanation may account for why Professor Delgado and Mr. Millen rely on the importance of technological advances. The problem with this explanation is that Professor Delgado and Mr. Millen also appear to allow for regulation of scientific inquiry under *O'Brien*. *See* Delgado & Millen, *supra* note 2, at 390-91. This regulation suggests that the hazardousness of a particular activity comes in at the balancing stage once the activity is deemed to have prima facie protection and not as part of the initial question of whether the inquiry is protected expression.

[130] Commentators emphasize the perceived importance of science "to a wide variety of individual and societal decisions ranging from one's views about the nature of man and the universe and the wisdom of governmental policies, to individual choices regarding the purchase of certain products." Robertson, *Scientist's Right, supra* note 2, at 1216. As Professor Ferguson puts it:

> [T]he applications of scientific knowledge have become so crucial to the quality of modern life that the research endeavor of natural science has acquired a new sense of mission, becoming not so much an effort to comprehend natural behavior as an effort to uncover new ways of directing, altering or controlling nature for human ends.

Ferguson, *Scientific Inquiry, supra* note 2, at 642.

[131] Robertson, *Scientist's Right, supra* note 2, at 1216.

[132] This concern is reflected in Professor Carmen's effort to distinguish experimentation that contributes knowledge to the marketplace of ideas from experimentation that involves nonmarketplace concerns. *See* I. CARMEN, *supra* note 2, at 112. To Professor Carmen, the distinction between basic and applied science for first amendment purposes seems to rest in part on the notion that as a *political* matter, the government has not traditionally regulated certain types of research as much as other types of research. *Id.* at 150-51. But that observation, even if true, does not imply either that there are *constitutional* limitations on the regulation of the traditionally unregulated activities or that the traditionally unregulated activities have anything else in common apart from governmental reluctance to regulate them for political reasons.

poses, then even if a distinction can be made between basic and applied research or technology, knowledge acquisition could be involved in all of the various research activities and not simply those designated as basic.[133]

The impetus behind the focus on basic research most likely arises from an effort to formulate a limiting principle to determine the ambit of first amendment protection. If only basic research is constitutionally protected expression, then not every individual or corporation engaged in, for example, the technological development of a weapon system, will be entitled to assert a claim that any regulation of the activities involved must satisfy heightened first amendment scrutiny. The concern is to provide protection for "academic" or "pure" science while excluding that "experimentation which is prima facie nonacademic."[134] Again, the distinction seems completely irrelevant for first amendment purposes. Moreover, other fundamental difficulties result from attempting to limit a first amendment theory to basic research.

Although it is possible to provide textbook definitions of basic and applied research,[135] predicating first amendment protection on the characterization of research would require courts to distinguish between basic and applied (or technological) research in specific situations. Such a task would create enormous practical difficulties. The distinction between basic and applied research "will constitute a spectrum, rather than a clear-cut cleavage"[136] and "[i]n practice, the distinction becomes hopelessly blurred, since practical research commonly produces major additions to knowledge, and fundamental research commonly yields important practical benefits."[137] Moreover, it is commonly accepted that "[s]cience currently is regarded as the partner of technology and, in this respect, as a utilitarian as well as a contemplative enterprise."[138] There has been voluminous writing to the effect that "[t]he pure science ideal pales . . . in light of the relationship between contemporary scientific

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[133] *But see infra* note 147.

[134] I. CARMEN, *supra* note 2, at 150.

[135] Professors Favre and McKinnon recognize the need to provide a "definition" of basic research that would be useful for purposes of restricting constitutional protection. Favre & McKinnon, *supra* note 2, at 662-68. The result of their effort is artificial and would exclude from its ambit many activities that clearly should receive constitutional protection. *See supra* note 25.

[136] B. ROLLIN, ANIMAL RIGHTS AND HUMAN MORALITY 92 (1981).

[137] W. PATON, MAN AND MOUSE: ANIMALS IN MEDICAL RESEARCH 24 (1984).

[138] G. KNELLER, SCIENCE AS A HUMAN ENDEAVOR 265 (1978). Professor Goldberg notes that "most of what is usually called scientific research . . . is a step or two over on the continuum from pure science. Most scientific work, even though it might be called basic research, is part of a program designed to accomplish a particular mission." *See* Goldberg, *Reluctant Embrace, supra* note 2, at 1351.

research and its technological applications."[139]

Specifically, basic science uses advanced technology. Funding sources, such as the government and private industry, seek applicable findings and technological applications. Practical considerations almost invariably dictate the problems that scientists will choose to investigate.[140] It is somewhat simplistic to think of basic science as "pure theory" or as the quest for "knowledge for its own sake."[141] Rather, "pure science" and applied research and technology have become interdependent, and it is difficult, if not impossible, to separate them. Academic scientific research has become "industrialized";[142] its "capital-intensive"[143] nature means that the scientist is "no longer an independent agent, free to investigate whatever problem he thinks best."[144] Although some "leading" scientists "will congregate at the great universities, enjoying favourable conditions of employment" as a result of their "intimate connections with the [funding] agencies,"[145] the vast remainder of researchers become involved in the entrepreneurial activity of turning government and industrial funds into an output of technologically "useful" information.[146] Furthermore, as will be explained in Part II, there are no content-neutral ways of distinguishing basic science for purposes

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[139] Furrow, *supra* note 120, at 1416; *see* G. KNELLER, *supra* note 138, at 261-87; J. RAVETZ, SCIENTIFIC KNOWLEDGE AND ITS SOCIAL PROBLEMS 44-57 (1971); Cavalieri, *Science as Technology,* 51 S. CAL. L. REV. 1153, 1156 (1978); Jonas, *Freedom of Scientific Inquiry and the Public Interest,* HASTINGS CENTER REP., Aug. 1976, at 15, 15; *see also* J. HABERMAS, TOWARD A RATIONAL SOCIETY 100-22 (1970) (suggesting that in capitalist countries research and technology have been fused to the point where "the sciences [are a] leading productive force"); H. MARCUSE, ONE DIMENSIONAL MAN 158 (1964) (discussing how "theoretical operationalism came to correspond to practical operationalism" in modern science to the point where the hope of separating pure and applied science becomes illusory).

[140] Furrow, *supra* note 120, at 1416-17; Goldberg, *Reluctant Embrace, supra* note 2, at 1350-52.

[141] Jonas, *supra* note 139, at 15.

[142] J. RAVETZ, *supra* note 139, at 44.

[143] *Id.* at 44.

[144] *Id.*

[145] *Id.* at 46-47.

[146] Ravetz argues that inherent in the milieu of contemporary science are "shoddy" science, or a "steady stream" of largely useless publications that serve as proof of continued competence, *id.* at 56; "entrepreneurial science," or research that does not reflect the desire of the scientist to investigate a problem other than for her ability to obtain necessary funding from government or industry, *id.* at 55-56; "reckless science," or science that is pursued for a profit motive without consideration of the "degradation of the natural and human environment" and where acceptable profit is "determined by the judgement of men in State agencies, in co-operation with the [industrial] promoters themselves," *id.* at 55; and "dirty science," or "projects whose intended application lies beyond the pale of civilized practice and morality," *id.* at 57. As Professor Furrow has noted, "[s]cience has come to depend upon successful applications of pure research to enable scientists to argue for continuing support. There is thus a continual spiral of support and application." Furrow, *supra* note 120, at 1417.

of limiting protected experimentation.[147]

[147] The difficulty of distinguishing between basic and applied science is especially apparent in Professor Carmen's analysis of the regulation of DNA experimentation. *See* I. CARMEN, *supra* note 2, at 34-37. Professor Carmen seeks to distinguish protected research from unprotected research using a version of the "basic/applied research" distinction. *Id.* at 40. He argues that it is not enough to know whether research is "subsidized by a profit-making organization for the purpose of reaping considerable financial rewards" because protectable research has been subsidized by private industry, such as John Bardeen's discovery of transistors while employed at Bell Laboratories. *Id.* at 45-46. Professor Carmen argues that a commercial setting cannot be dispositive and that it is necessary to focus on the "totality of facts" in each case to determine what falls within the scope of protection. *Id.* at 46. Professor Carmen likens his approach to that used by the Court in determining due process fundamental fairness. *See id.* at 46 n.51 (citing McKeiver v. Pennsylvania, 403 U.S. 528 (1971); Rochin v. California, 342 U.S. 165 (1952); Palko v. Connecticut, 302 U.S. 319 (1937); Powell v. Alabama, 287 U.S. 45 (1932)).

As an example of his analysis, Professor Carmen discusses the Court's decision in Diamond v. Chakrabarty, 447 U.S. 303 (1980). *See* I. CARMEN, *supra* note 2, at 6-8, 44-47. Chakrabarty, a microbiologist employed by General Electric, asserted patent claims related to his invention of a genetically altered bacterium capable of degrading the multiple components of crude oil, and treating oil spills. Chakrabarty claimed patents on the process or method of producing the bacteria as well as to the bacteria themselves. The patent examiner allowed the claims except for those on the actual bacteria, which, the examiner reasoned, were not patentable subject matter because living organisms and products of nature are not protectable under the patent statute. *See* 35 U.S.C. §§ 1-140 (1982 & Supp. III 1985) (Section 101 provides for the protection of a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."). The Patent Office Board affirmed the examiner and the Court of Customs and Patent Appeals reversed. The Court, affirming, held that although the "laws of nature, physical phenomena, and abstract ideas have been held not patentable . . . [Chakrabarty's] micro-organism plainly qualifies as patentable subject matter . . . [as] a nonnaturally occurring manufacture or composition of matter." 447 U.S. at 309.

Professor Carmen argues that Chakrabarty's experimentation did not deserve to be called "expressive activity" because his "experiments revealed nothing new about the nature of our planet or its life forms" and were intended solely to allow his employer to benefit financially. I. CARMEN, *supra* note 2, at 46. Accordingly, it was proper for a patent to be issued to Chakrabarty because the marketplace of ideas would not have been injured by a grant of the patent monopoly. Professor Carmen notes that Chakrabarty's earlier experimentation in degrading capabilities of various bacteria was distinguishable as "expressive activity" because he "advanced our knowledge" about these genetic materials. *Id.* Professor Carmen concludes that his analysis preserves the "classical inquiry-technology distinction . . . but that now we perceive these modes, not as watertight categories, but as functional concepts capable of assuming particular blends depending upon the totality of facts." *Id.* (footnote omitted).

Professor Carmen's analysis is confused in a number of respects. First, Carmen appears to link his argument for the protection of basic science with the patent scheme. If a particular discovery is properly patentable, then according to Professor Carmen, that should reflect a judgment that withdrawing the discovery from the marketplace of ideas through the granting of the patent will not injure the marketplace in a substantial way. If a discovery cannot properly be patented, then that inability should, in at least some cases, reflect the value of the knowledge to the marketplace of ideas. Professor Carmen's use of the patent scheme to define the boundaries between basic and applied research is confused because, as mentioned earlier, both basic and applied research, however understood, as well as patentable and unpatentable discoveries, can make contributions to the marketplace of ideas. Professor Carmen's attempt to link unpatentable

Any attempt to predicate first amendment protection on some con-

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discoveries with basic science and patentable discoveries with applied science or technology simply does not work. Professor Carmen distorts the facts of *Chakrabarty* precisely because of this confusion. Although the Court noted that Chakrabarty had earlier discovered that certain genetic materials controlled oil-degrading capabilities in bacteria, the Court also explicitly noted that "[i]n the work represented by the patent application at issue here, Chakrabarty discovered a process" that could combine different types of genetic materials in a single bacterium that otherwise possessed no ability to degrade oil. 447 U.S. at 305 n.1. Professor Carmen overlooks this "discovery" and fails to explain why it did not "advance our knowledge" in the same or similar way as did Chakrabarty's earlier work. Rather, Professor Carmen characterizes this second discovery as Chakrabarty merely "negotiat[ing] recombinant DNA processes to create a hybrid bacterium, clones of which would be unleashed solely to clean up the environment at a profit." I. CARMEN, *supra* note 2, at 46. It is clear that Chakrabarty's later work, which Professor Carmen would label unprotected "nonspeech," *id.* at 47, had a "goal"; but that "goal" was the *same* as the one in Chakrabarty's earlier work, which Professor Carmen labels protected "speech plus" analogous to parades or pickets. In both cases, Chakrabarty "discovered" certain findings and then "applied" the findings of his work.

Second, Professor Carmen fails to recognize that the patent scheme to which he and others explicitly point as support for the first amendment status of at least basic experimentation demonstrates the *opposite* in a case such as *Chakrabarty.* As mentioned above, Chakrabarty received not only a patent on the genetically engineered bacteria, but also a patent on the *process* by which he transferred genetic materials from certain bacteria to a separate host bacterium that did not itself have oil-degrading capacity. What was at issue for Chakrabarty was his claim for a patent on the bacteria itself, not on the process that the Court acknowledged Chakrabarty had discovered and that the patent examiner had allowed without objection. The Court indicated clearly that the validity of the patent on the process was not at issue in the case. *Chakrabarty,* 447 U.S. at 305-06. What Professor Carmen and others do not recognize is that patents on processes may "confer power to block off whole areas of scientific development." Brenner v. Manson, 383 U.S. 519, 534 (1966) (footnote omitted). If a process patent is issued, then the patent holder may, at least in theory, enjoin others who seek to use the process in further research or experimentation. Reliance on the distinction between patentable and nonpatentable matter not only provides little support for according first amendment protection to experimentation but suggests instead that the patent scheme explicitly recognizes that experimentation is not protected by the first amendment.

One commentator has remarked that "[c]ontrary to widely held belief, the [patent] statute does not immunize or exempt personal or noncommercial use." 2 P. ROSENBERG, PATENT LAW FUNDAMENTALS § 17.02[1] (2d ed. 1987). Although some courts have held "experimental" uses to be noninfringing if "for philosophical or amusement purposes," Northill Co. v. Danforth, 51 F. Supp. 928, 929 (N.D. Cal. 1942) (citation omitted), *modified,* 141 F.2d 51 (9th Cir. 1944), it would be a gross exaggeration to characterize these courts as creating a broad "exemption" for "experimental" uses given the relatively restricted circumstances in which the notion of "experimental" use has been recognized and the limited number of cases available. *See, e.g.,* Spray Refrigeration Co. v. Sea Spray Fishing, Inc., 322 F.2d 34, 36-37 (9th Cir. 1963) (holding that experimental use cannot be coupled with any commercial benefit); Finney v. United States, 194 U.S.P.Q. (BNA) 197, 197 (Ct. Cl. 1976) (holding one single act of infringement for testing is *de minimus* infringement of patent); Imperial Chem. Indus. v. Henkel Corp., 545 F. Supp. 635, 656 (D. Del. 1982) (rejecting experimental use defense). *But see* Dugan v. Lear Avia, Inc., 55 F. Supp. 223, 229 (S.D.N.Y. 1944) (finding no infringement where the device was built "only experimentally and [the defendant] neither manufactured it for sale nor sold any" (citation omitted)), *aff'd,* 156 F.2d 29 (2d Cir. 1946). Rosenberg concludes that the experimental use doctrine may be "erroneously believed" to prohibit only commercial infringement. 1 P. ROSENBERG, *supra,* § 2.08.

cept of basic science would not overcome the problem that was identified earlier: if facilitative conduct is not itself communicative, it does not *become* communicative because it is linked with what might be expression under first amendment theory. Even if the characterization of scientific activities as "basic" and "applied" were somehow relevant for first amendment purposes, which it is not, such characterization would involve courts in hopelessly confused and confusing inquiries.[148]

The patent scheme should be contrasted with the copyright scheme, which, through the doctrine of "fair use," explicitly allows many types of commercial and noncommercial uses of copyrighted material if these uses are consistent with the public interest. *See* 17 U.S.C. § 107 (1982). The fair use doctrine explicitly allows copyrighted expression to be used for "research" purposes. *Id.* The Court has recently indicated that it is taking a narrower view of fair use than has been traditional. *See* Francione, *Facing* The Nation: *The Standards for Copyright, Infringement, and Fair Use of Factual Works,* 134 U. PA. L. REV. 519, 544-51 (1986) (discussing Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539 (1985)). Nevertheless, copyright doctrine still contains a broad exemption for the use of protected materials in subsequent research, whereas patent doctrine contains no such exemption. The patent statute, 35 U.S.C. §§ 1-140 (1982 & Supp. III 1985), and the copyright statute, 17 U.S.C. §§ 101-914 (1982 & Supp. III 1985), were both enacted pursuant to an explicit constitutional provision, U.S. CONST. art. I, § 8, cl. 8.

[148] Although a discussion of the regulation of experimentation as protected expression is beyond the scope of this Article, it should be noted that even if experimentation received prima facie first amendment protection, the regulation of at least some experimentation might be evaluated under the commercial speech doctrine. There is a common, though erroneous, belief that only those motivated altruistically to bestow an inestimable "benefit" on human beings or those who seek knowledge for its own sake pursue careers in science. There is little understanding of "industrial" research, in which the benefit sought to be provided is yet another type of lipstick, oven cleaner, or bomb. In some ways, a type of nascent recognition of the commercial nature of much research may account for the awkward attempts of some commentators to distinguish between "basic" and "applied" research for purposes of determining the scope of first amendment protection. *See infra* notes 135-47 and accompanying text.

The government generally can regulate the activities of commercial entities, and this ability should ostensibly include the regulation of research conducted by commercial entities. One anomalous consequence of according first amendment protection to experimentation is the requirement that the regulation of commercial research be subject to scrutiny that is not required for regulation of most of the other activities of the commercial entity. Much industrial experimentation is intended to result in the production and sale of products by corporations. Although the general view is predicated in large part on the value of such items to the public generally, there is clearly some question as to whether full first amendment protection should be accorded to all purely commercial experimentation even if some experimentation is regarded as expressive.

The Court regards commercial speech as worthy of protection, but both the definition of commercial speech and the scope of its protection are unclear. The Court has not provided any criteria for identifying commercial speech other than broadly describing it to include "speech which does 'no more than propose a commercial transaction,' " Virginia State Bd. of Pharmacy v. Virginia Citizens Consumer Council, Inc., 425 U.S. 748, 762 (1976) (quoting Pittsburgh Press Co. v. Pittsburgh Comm'n on Human Relations, 413 U.S. 376, 385 (1973)), or as "expression related solely to the economic interests of the speaker and its audience." Central Hudson Gas & Elec. Corp. v. Public Serv. Comm'n, 447 U.S. 557, 561 (1980). The Court has also recognized that distinguishing commercial from noncommercial expression is difficult. *Compare In re*

C. *Summary*

Part I of this Article has examined the arguments that experimenta-

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Primus, 436 U.S. 412 (1978) (holding that the solicitation of a client by an ACLU lawyer was protected noncommercial expression) *with* Ohralik v. Ohio State Bar Ass'n, 436 U.S. 447 (1978) (holding that the solicitation of a client by a personal injury lawyer was unprotected commercial speech). Such distinctions may require a determination of "the purpose or motive of the speaker." *Primus,* 436 U.S. at 438 n.32. But in at least one case, motive was ignored, and the speech of a corporation ceased entirely to be "commercial" because the speech was political in content. *See* First Nat'l Bank v. Bellotti, 435 U.S. 765, 784 (1978).

As to the scope of protection, the Court has endorsed a "more permissive approach to regulation of the manner of commercial speech for the purpose of protecting consumers from deception or coercion." *Central Hudson,* 447 U.S. at 578 (Blackmun, J., concurring); *see Virginia State Bd. of Pharmacy,* 425 U.S. at 771-72 (stating that, "much commercial speech is . . . deceptive or misleading" and that "[t]he First Amendment . . . does not prohibit the State from insuring that the stream of commercial information flow cleanly as well as freely"). This more permissive approach to evaluating the regulation of content is justified by the recognition that the value of commercial communications is diminished if they are "more likely to deceive the public than to inform it," *Central Hudson,* 447 U.S. at 563, and because commercial communications allegedly are more amenable to "objective" determination of their truth or falsity than are "news reporting or political commentary." *Virginia State Bd. of Pharmacy,* 425 U.S. at 772 n.24. The Court initially seemed predisposed to accord *full* first amendment protection to commercial speech that was "truthful," or not misleading. In *Central Hudson,* the Court ostensibly departed from this full-protection approach and held that "[t]he Constitution . . . accords a lesser protection to commercial speech than to other constitutionally guaranteed expression." 447 U.S. at 562-63. The *Central Hudson* approach was affirmed recently in Posadas de Puerto Rico Assocs. v. Tourism Co., 106 S. Ct. 2968 (1986), which involved the regulation of the advertisement of casino gambling. In upholding the content regulation involved in *Posadas,* the Court refused to apply strict scrutiny analysis even though the advertisements were not alleged to be untruthful or misleading. The commercial speech in *Posadas* was entitled only to a "limited form of First Amendment protection," *id.* at 2976, and "the greater power [of the Commonwealth] to completely ban casino gambling necessarily includes the lesser power to ban advertising of casino gambling," *id.* at 2979. The Court adopted a "reasonableness" standard in evaluating legislative judgments about whether particular regulations advance government interests. *Id.* at 2977.

It is difficult to apply commercial speech theory to experimentation performed in commercial contexts or to experimentation by academics performed under contract with commercial entities. If experimentation is expression, it is expressive conduct rather than pure speech, and, accordingly, it becomes more difficult to determine the threshold question of whether such commercially expressive conduct concerns lawful activity that is not misleading. When an experimenter is testing the toxicity of an oven cleaner by feeding it to dogs, the experimenter is not engaging in commercial expression intended directly to sell the product. An inquiry into whether expressive conduct of a commercial nature was misleading would ostensibly entail an inquiry into whether the testing methodology used by the experimenter was "valid" under prevailing notions of scientific inquiry. Although such content-related judgments by courts would ostensibly be problematic under first amendment theory, it is clear that "the government may regulate the content of commercial speech in order to prevent the dissemination of information that is false, deceptive or misleading." *Id.* at 2981 (Brennan, J., dissenting). An inquiry into the validity of commercially expressive conduct would be analogous to an inquiry into the ultimate dissemination of pure commercial expression concerning the oven cleaner. Whether such a judicial inquiry would pose extreme practical difficulties

tion and research are expression or expressive conduct protected by the first amendment. Some of these arguments seek to analogize experimentation to expressive activity that facilitates expression. Under marketplace theory, however, the fact that conduct facilitates expression does not make it protectable, unless the conduct itself is expressive. Only if the actor intends to communicate in a context in which the communication is likely to be understood by actual or potential observers does the first amendment even apply. Furthermore, there is nothing inherent in the experimental process that otherwise allows experimentation to be characterized as expression or expressive conduct. If experimentation does involve communicative elements, then it is protected as expression, and its status as experimentation becomes irrelevant.

Some commentators have sought to limit first amendment protection to basic research. Again, the characterization of research as basic science is irrelevant to whether the research is expression or expressive conduct. In addition, there are substantial difficulties that militate against predicating first amendment protection on the status of experimentation as basic or applied. Part II of this Article examines the arguments for protection of experimentation as noncommunicative conduct that facilitates scientific speech.

II. Experimentation as a Noncommunicative "Precondition" to the Dissemination of Scientific Expression

Although the language of "expressive conduct" permeates the general view, there are also arguments, albeit confused, that the first amendment protects experimentation even if it is a *noncommunicative* precondition to the dissemination of scientific expression. One commentator argues that "[if] the first amendment serves to protect free trade in the dissemination of ideas and information, it must also protect the necessary preconditions of speech, such as the production of ideas and in-

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is, of course, a different question.

In any event, *Central Hudson* and *Posadas* suggest that regulation of experimentation as commercially expressive conduct may be subject to less scrutiny than would be applicable to regulation of expressive conduct that was not commercial in nature. What remains to be developed is a theory of what experimentation can properly be labeled as "commercial." Much experimentation, such as that related directly or indirectly to product testing and development done by commercial entities or by others under contract with those entities, may be characterized as "commercial" without difficulty. But it is now recognized that there is extensive commercial involvement even in what would be characterized as "academic" research. This commercial involvement necessitates a detailed analysis to determine the ambit of commercial speech doctrine as far as experimentation is concerned.

formation through research."[149] The first amendment, another commentator concludes, protects "noncommunicative conduct essential to the ability of individuals to engage in free expression."[150] This Part examines these alternative arguments.

A. *General Preconditions, Information-Gathering, and Experimentation as the Process of Science: Three Approaches and Three Problems*

To the extent that the general view moves away from the expressive conduct model, it does so using three arguments. The first argument, offered primarily by Professor Robertson, is that the first amendment provides at least prima facie protection for all "essential

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[149] Robertson, *Scientist's Right, supra* note 2, at 1217-18 (footnote omitted).

[150] Ferguson, *Scientific Inquiry, supra* note 2, at 650. Other commentators whose first amendment theories provide protection for noncommunicative preconditions of speech include Professor Blasi, *see* Blasi, *The Checking Value in First Amendment Theory,* 1977 AM. B. FOUND. RES. J. 521; and Professor Redish, *see* Redish, *The Value of Free Speech,* 130 U. PA. L. REV. 591 (1982).

When attempting to support an argument that experimentation is a protected noncommunicative precondition to communication, commentators frequently cite Buckley v. Valeo, 424 U.S. 1 (1976), and First Nat'l Bank v. Bellotti, 435 U.S. 765 (1978). *See, e.g.,* Ferguson, *Scientific Inquiry, supra* note 2, at 650-54; Robertson, *Scientist's Right, supra* note 2, at 1218 n.59. Both *Buckley* and *Bellotti,* however, involved speech, not noncommunicative preconditions to speech. In *Buckley,* the Court held that provisions in the Federal Election Campaign Act of 1971, Pub. L. No. 92-225, 86 Stat. 3 (1972), *amended by* Pub. L. No. 93-443, 88 Stat. 1263 (1974), regulating campaign expenditures, violated the first amendment. 424 U.S. at 143. Overturning the court of appeals decision on this point, which, under United States v. O'Brien, 393 U.S. 367 (1968), had found the expenditure provisions acceptable governmental regulation of conduct, Buckley v. Valeo, 519 F.2d 821, 840 (D.C. Cir. 1975), the Court stated that "this Court has never suggested that the dependence of a communication on the expenditure of money operates itself to introduce a nonspeech element or to reduce the exacting scrutiny required by the First Amendment." 424 U.S. at 16 (citations omitted); *see also* Baker, *Realizing Self-Realization,* 130 U. PA. L. REV. 646, 650 (1982) ("Virtually any first amendment theory would conclude that an individual's use of her resources to make or sponsor political communications is speech for first amendment purposes." (footnote omitted)). *But see* Wright, *Politics and the Constitution: Is Money Speech?,* 85 YALE L.J. 1001, 1011-13, 1019 (1976) (concluding that the use of money is essential for "effective political speech" under some definitions of effectiveness, but it is not itself expressive). Likewise, in *Bellotti,* the Court invalidated a Massachusetts statute, MASS. GEN. LAWS ANN. ch. 55, § 8 (West Supp. 1977), that limited campaign contributions by corporations. The Court treated the issue as one concerning the pure political speech of a corporation and stated: "If the speakers here were not corporations, no one would suggest that the State could silence their proposed speech. It is the type of speech indispensable to decisionmaking in a democracy . . . ." 435 U.S. at 777. *Buckley* and *Bellotti* simply do not support an argument that noncommunicative preconditions to speech are protected by the first amendment.

Similarly, cases that recognize associational rights should not be viewed as protecting activity because it facilitates speech, but rather as protecting activity because of the "close nexus between the freedoms of speech and assembly." NAACP v. Alabama, 357 U.S. 449, 460 (1958); *see* cases cited *supra* note 76.

preconditions for dissemination of information."[151] Professor Robertson argues that the precondition argument supports protection for experimentation "given the premises and purposes of the first amendment."[152]

The second argument particularizes the first general precondition argument by analogizing experimentation to news or information-gathering. The information gathered may be neither spoken nor written but will be disseminated at some later time. This approach builds on cases holding that the first amendment protects some gathering of information.[153] It argues that, just as information-gathering is a precondition to news-reporting, experimentation is a precondition to scientific expression.

The third argument seeks to characterize the information-gathering activities of experimenters as different from the information-gathering activities of the press.[154] According to this view, scientific "speech" has no *meaning* apart from testing through the scientific method.[155] This argument emphasizes that, although experimentation is a precondition of speech, the importance of information-gathering to scientists transcends its importance to reporters or the general public and that the first amendment protects the *process* of information-gathering in science.[156]

The general view relies heavily upon the " 'consequentialist' theory of . . . free speech . . . [according to which] the free flow of information and ideas plays an important role in promoting a wide range of desired social ends."[157] These three arguments appeal strongly to this instrumental aspect of marketplace theory in two respects. First, the arguments characterize experimentation as being *itself* instrumental to scientific speech. Second, the arguments maintain that scientific speech "has a direct and vital bearing on a wide range of public policy issues

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[151] Robertson, *Scientist's Right, supra* note 2, at 1216. Professor Robertson also uses his general precondition argument when he discusses the right to receive communication. It appears, however, that in the "receipt" context, he views the preconditions as themselves involving some sort of communication. *See supra* notes 99-109 and accompanying text.

[152] Robertson, *Scientist's Right, supra* note 2, at 1217.

[153] *See* Globe Newspaper Co. v. Superior Court, 457 U.S. 596, 607-10 (1982); Richmond Newspapers, Inc. v. Virginia, 448 U.S. 555, 580 (1980); *see also supra* notes 99-109 and accompanying text.

[154] *See* Delgado & Millen, *supra* note 2, at 378; Ferguson, *Scientific Expression, supra* note 2, at 536-41; Robertson, *Scientist's Right, supra* note 2, at 1204.

[155] *See* Robertson, *Scientist's Right, supra* note 2, at 1205.

[156] Professor Ferguson goes so far as to argue that the pure speech of experimenters is protected because such speech facilitates the *process* of science, including experimentation. *See* Ferguson, *Scientific Expression, supra* note 2, at 536-41.

[157] *Id.* at 536.

. . . . Indeed, scientific knowledge is crucial to such an array of specific policy issues that many analysts feel it should play a larger role in the general process of policy formation."[158] Science is considered instrumental for self-government and social stability, and experimentation is instrumental for science. By appealing to the instrumental aspect of marketplace theory, these arguments for the protection of experimentation seem more plausible than considering experimentation as expressive conduct.

There are, however, three general problems with the arguments that seek to predicate protection for experimentation on the ground that it is a noncommunicative precondition to the dissemination of scientific speech. First, there is currently no support in first amendment jurisprudence for the broad protection of preconditions necessary to accommodate the constitutional status per se of experimentation. The Court has continually rejected most claims that preconditions of speech are protected by the first amendment. Although the Court has accorded limited protection to claims of access or information-gathering, upon which the second precondition argument relies explicitly, the Court has limited the scope of protection to instances involving public participation in important political and governmental processes, such as criminal trials.[159] The current Court is unlikely to expand broad general first amendment protection for preconditions of expression, but it is, of course, possible that increasing interest in the regulation of biotechnology may result in the Court attempting to fashion some type of protection for experimentation. The first problem, then, may be significant as a practical limitation but is least important from a theoretical perspective because the Court may alter first amendment doctrine.

Second, any force that the precondition arguments may possess derives from an artificial and unjustified distinction between "scientific" speech and other types of speech. The general view rests heavily on the noncontroversial assertion that pure "scientific" expression is protected by the first amendment. But the expression of a "scientist" receives no more or less protection than the expression of a philosopher, politician, historian, novelist, or any other person. Pure scientific expression is protected because it is *expression* and not because it is *scientific.* Apart from the theoretical and practical difficulty that would be involved in

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[158] *Id.* at 543.

[159] These instances are not only distinguishable factually from claims concerning the protection of experimentation, but the theoretical framework that the Court has employed to evaluate claims for protection of preconditions of speech in the context of information-gathering simply would not accommodate protection of experimentation per se.

any attempt to define "scientific" speech for first amendment purposes, a distinction between "scientific" speech and other types of speech, together with a recognition that the first amendment protects "scientific" speech, simply does not lead to the proposition that the first amendment protects the noncommunicative preconditions of "scientific" speech any more than it protects the noncommunicative preconditions of other speech.

The third and perhaps most serious problem with the precondition arguments is that, even if the preconditions of speech, or only "scientific" speech, are protected, some limiting principle or set of criteria is needed to restrict the virtually unlimited extension of first amendment protection that would result. The necessity of a limiting principle is implicit in the general view. The general view rests on the utility of scientific research both to society, in the form of what are alleged to be valuable contributions to "progress," and to the marketplace of ideas, in the form of what are alleged to be epistemologically superior input. Not every instance of what a claimant may sincerely label a "scientific experiment" will make these contributions. It is necessary, therefore, somehow to limit the preconditions of speech that the first amendment will protect. If the general view seeks prima facie protection for *every* instance of what is sincerely claimed to be experimentation of research, then the general view would undercut its own premise that the first amendment should protect science because of its inestimable practical value to society and its theoretical importance to the marketplace of ideas. Furthermore, even if courts did accord prima facie protection to every action that any claimant labeled as experimentation or research, courts would still need to use some limiting principle to balance competing interests to determine whether the activity would ultimately be protected in the particular case. Formulating such a limiting principle, however, would involve courts in a hopelessly confused inquiry into the value of particular forms of research, which would in turn entail content-related judgments about research.[160]

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[160] It may be argued that "experimentation" may be defined in a content-neutral manner as a broad category so as to avoid any problem of content-related judgments about research and that such an approach would permit all claims of experimentation to receive at least prima facie first amendment protection. For example, a critic of this approach may claim that there is an intuitive difference between baseball and cancer research and that this intuition is explained by the fact that most research is done by those who wish to engage in clearly protected activity in the form of disseminating or publishing the results of the research and that most baseball, or at least nonprofessional baseball, is not played for the purpose of disseminating the results of the game. The critic may conclude that those experimental activities that will receive first amendment protection are those that are typically associated with the protected activity of dissemination or publication and that this category of activities is delimited in a content-neu-

The remainder of this section examines the three precondition arguments that appear in the general view and illustrates the three problems described above. The discussion also focuses on the peculiar difficulties that the third precondition argument raises. This examination reveals both that no precondition approach finds significant support in current first amendment doctrine and that all the approaches implicitly require the existence of some limiting principle. The next section explores the problems inherent in the formulation of any limiting principle. Just as the characterization of experimentation per se as "expression" would require the marketplace theorist to accept solutions inimical to marketplace theory, the formulation of a limiting principle would likewise require impermissible content discrimination among types of experimentation.

1. General Precondition Argument

Professor Robertson states a general argument for the protection of experimentation as a precondition to scientific speech: "[S]cientific knowledge and information is thus as clearly within the protection of the first amendment as is political speech. . . . As an essential step in the process of dissemination of ideas and information, research should have the same constitutional status as dissemination itself."[161] Robertson appears to argue that virtually all preconditions of speech are to be accorded first amendment protection. For example, when he discusses research protected as part of what he understands to be the right to receive information, he states, "[a] right to research cannot, of course, be limited to basic research or even to scientific research."[162] If Profes-

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tral manner.

The intuition on the part of the critic about the difference between these categories of activities may be correct. But the ability to define research as information-gathering activity that is intended to be disseminated or published does not obviate the problem of making content-related judgments about the value of particular experimental activities. Virtually all claims for protection of information-gathering seek that protection in order to facilitate some later dissemination. Even if all claims of information-gathering were accorded prima facie first amendment protection on the theory that the *category* of information-gathering activities is itself value neutral, content discrimination *within* the broad category would still be required to determine whether particular experiments would ultimately be allowed.

[161] Robertson, *Scientist's Right, supra* note 2, at 1216-17.

[162] *Id.* at 1225 n.89. Professor Robertson goes so far as to criticize courts that "have been reluctant to scrutinize the asserted state interests as closely as a first amendment argument would require" when a claimant argues that the nonmedical use of mind-altering drugs is a necessary precondition for experiencing certain mental or emotional states. *Id.* at 1219 n.59. Professor Robertson accepts, however, that such preconditions might be unprotected because "health and safety concerns [are] often implicated." *Id.*

Professor Robertson appears confused about the stage at which "state interests"

sor Robertson does indeed mean to argue that all preconditions are to be accorded prima facie protection, then his argument goes not only beyond any support in case law, but beyond even the most protective first amendment theories. The fact that speech is protected does not mean that preconditions of speech are protected as well. For example, a child may wish to announce to her parents that her team won an afternoon baseball game. Her playing in that baseball game is a precondition to her speech. It does not follow, however, that the actual playing of the game is protected by the first amendment. To accord protection in such circumstances would require that any regulation of the playing of baseball be evaluated under a first amendment framework. The government could inhibit the child's dissemination of information about the baseball game by prohibiting the playing of baseball. Such a prohibition, however, would not trigger first amendment concerns.

Although some of his comments suggest that he would accord prima facie protection to an unlimited variety of preconditions, Professor Robertson does maintain that "[w]ith scientific research, the case for first amendment protection is all the more compelling."[163] But there is simply no reason why the first amendment should accord greater protection to the preconditions of scientific speech than to the preconditions of other speech. Moreover, to justify enhanced first amendment protection for experimentation, the general view emphasizes the utilitarian benefits of science to society.[164] No one maintains that any event labeled as "experimentation" provides such benefits, but that only "scientific" experimentation is at issue.

The difficulty is that even if the general precondition argument is limited to "scientific" experimentation, the need for a limiting principle still exists. Assume, for example, that an experimenter seeks to dig under the streets of New York City looking for Atlantis. Her digging is a precondition to her disseminating information about her exploration. Even if this precondition is given prima facie protection by the first amendment, the state, under the balancing prescribed in *United States v. O'Brien*,[165] could surely prevent the experimenter from digging. Regardless of whether her experimentation was an activity given prima

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should enter into the analysis. *See id.* at 1247-59; *supra* note 109. At times, Professor Robertson seems to suggest that all preconditions are protected and may only be regulated if relevant first amendment balancing tests are satisfied. Robertson, *Scientist's Right, supra* note 2, at 1251-52. At other times, Professor Robertson seems to suggest that state interests can enter into the analysis at an earlier stage to exclude preconditions from the class of acts protected. *See id.* at 1255-57.

[163] *Id.* at 1225 n.89.

[164] *See supra* notes 12-18 and accompanying text.

[165] 391 U.S. 367 (1968).

facie protection by the first amendment, it is somewhat problematic that the claim would even require first amendment scrutiny.

2. News-Gathering

The second precondition argument, building on cases in which the Court has recognized some first amendment protection for the gathering of information, makes an analogy between experimentation and news-gathering. The breadth of this analogy is problematic. The general view emphasizes that the Court, in defining the right to gather information in particular circumstances, has refused to treat the public differently from the press,[166] and therefore scientists, as members of the public, should enjoy these information-gathering rights. The general view fails to recognize, however, that the Court has carefully circumscribed the protection of information-gathering in a way that precludes extending protection to experimentation in most circumstances.[167]

Building on dicta in *Zemel v. Rusk*[168] and *Branzburg v. Hayes*[169] that suggested that the first amendment might protect some information-gathering, the Court in *Richmond Newspapers v. Virginia*[170] held that there was a public right of access to attend criminal trials.[171] Jus-

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[166] *See, e.g.*, Branzburg v. Hayes, 408 U.S. 665, 684 (1972) (stating that "the First Amendment does not guarantee the press a constitutional right of special access to information not available to the public generally"); *see also* Ferguson, *Scientific Inquiry, supra* note 2, at 653 n.55 (noting the Court's refusal to draw any distinction between the first amendment rights of the press and those of the public); Robertson, *Scientist's Right, supra* note 2, at 1226 & n.93 (discussing the relationship between the right of the press and that of the public to gather information).

[167] *See infra* notes 183-92 and accompanying text.

[168] 381 U.S. 1, 16 (1965).

[169] 408 U.S. 665, 679-84 (1972).

[170] 448 U.S. 555 (1980).

[171] *Id.*, at 579-80. In *Zemel*, the Court rejected a citizen's argument that the first amendment protected his right to travel to Cuba to gather information about that country. The Court rejected the claim that the first amendment was in any way implicated and held that the refusal to validate a passport for Cuba affected only the traveler's action, and "[t]here are few restrictions on action which could not be clothed by ingenious argument in the garb of decreased data flow. . . . The right to speak and publish does not carry with it the unrestrained right to gather information." 381 U.S. at 16-17. This language in *Zemel* was thought to imply the existence of some limited right to gather information. *Richmond Newspapers*, 448 U.S. at 586 (Brennan, J., concurring). In Kleindienst v. Mandel, 408 U.S. 753 (1972), the Court upheld the power of the Attorney General to bar the entry to the United States of a Belgian journalist who was also a Marxist theoretician. Although the Court rejected the claim that citizens of the United States had a first amendment right to have him enter and to "hear his views and engage him in a free and open academic exchange," *id.* at 764, the Court refused to rely on *Zemel* to hold that the regulation affected travel or conduct, but not speech. *Id.*

Professor Robertson uses the rejection in *Kleindienst* of the *Zemel* speech/conduct distinction to argue that experimentation is protected, but he also recognizes that *Klein-*

tice Stevens correctly characterized *Richmond Newspapers* as a "water-

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dienst merely reflected "the Court's willingness in many other contexts to extend first amendment protection to expression that could be characterized as conduct." Robertson, *Scientist's Right, supra* note 2, at 1228. Professor Robertson's analysis of *Kleindienst* indicates that he views experimentation as expressive conduct, as well as a nonexpressive precondition to communication.

The right to gather information, which is relied on to support protection for experimentation, is usually traced to the decision in *Branzburg,* 408 U.S. 665. The *Branzburg* Court stated that "without some protection for seeking out the news, freedom of the press could be eviscerated." *Id.* at 681. Nevertheless, although "reporters remain free to seek news from any source by means within the law," *id.* at 681-82, the Court held that the press enjoyed no access rights "to information not available to the public generally," *id.* at 684, and held that members of the press, like members of the general public, were required "to respond to grand jury subpoenas as other citizens do and to answer questions relevant to an investigation into the commission of crime." *Id.* at 682. Relying on prior decisions that did not subject incidental burdens on the press to heightened first amendment scrutiny, *see id.* at 683 (citing, inter alia, Associated Press v. NLRB, 301 U.S. 103 (1937) (holding that the Associated Press was not exempt from incidental burdens on news-gathering imposed by the National Labor Relations Act)), the Court noted that "otherwise valid laws serving substantial public interests may be enforced against the press as against others, despite the possible burden that may be imposed." *Id.* at 682-83. Furthermore, the Court noted that if it were to adopt a first amendment privilege for newspersons, "[s]ooner or later, it would be necessary to define those categories of newsmen who qualified for the privilege . . . . [given that] [t]he informative function asserted by representatives of the organized press in the present cases is also performed by lecturers, political pollsters, novelists, academic researchers, and dramatists." *Id.* at 704-05 (citations omitted). Drawing distinctions among possible beneficiaries of such a privilege would be "a questionable procedure in light of the traditional doctrine that liberty of the press is the right of the lonely pamphleteer who uses carbon paper or a mimeograph just as much as of the large metropolitan publisher who utilizes the latest photocomposition methods." *Id.* at 704. Justice Powell, who provided the fifth vote for the Court, concurred in the majority opinion but wrote that in his view, "[t]he Court [did] not hold that newsmen, subpoenaed to testify before a grand jury, are without constitutional rights with respect to the gathering of news or in safeguarding their sources." *Id.* at 709 (Powell, J., concurring). Rather, Justice Powell reasoned that "[t]he asserted claim to privilege should be judged on its facts by the striking of a proper balance between freedom of the press and the obligation of all citizens to give relevant testimony with respect to criminal conduct." *Id.* at 710.

In dissent, Justice Douglas, relying on the need for an informed citizenry, argued that "status as a reporter is less relevant than . . . status as a student who affirmatively pursued empirical research to enlarge his own intellectual viewpoint." *Id.* at 714-15 (Douglas, J., dissenting). Justice Stewart, also in dissent, relied on *Zemel* and argued that "a right to gather news, of some dimensions, must exist" because "[n]ews must not be unnecessarily cut off at its source." *Id.* at 728 (Stewart, J., dissenting).

In three subsequent "access" cases, Saxbe v. Washington Post Co., 417 U.S. 843 (1974); Pell v. Procunier, 417 U.S. 817 (1974); and Houchins v. KQED, Inc., 438 U.S. 1 (1978), the Court denied press and public access to prison facilities where the "right to *receive* ideas and information [was] not the issue . . . [but rather] [t]he issue [was] a claimed special privilege of access[,] . . . a right which is not essential to guarantee the freedom to communicate or publish." *Houchins,* 438 U.S. at 12 (citations omitted). The majority opinions in *Pell* and *Saxbe* were written by Justice Stewart, who had provided the vigorous dissent in *Branzburg* upon which the general view relies for its argument that experimentation is protected by the first amendment. Justice Stewart also dissented in Zurcher v. Stanford Daily, 436 U.S. 547 (1978), in which the Court held that a search by police of a newspaper office did not violate any first

shed case."[172] Prior cases had only concerned the dissemination of ideas and "never before [had the Court] squarely held that the acquisition of newsworthy matter is entitled to any constitutional protection whatsoever."[173] Although there was no opinion on behalf of the Court, Justice Brennan's opinion concurring in the judgment contained the framework that the Court ultimately accepted in part.[174]

Justice Brennan identified the right to gather information where what was involved was "communication between speaker and listener."[175] But the right to gather information was broader, he argued, and "thus entails solicitude not only for communication itself, but also for the indispensable conditions of meaningful communication."[176] Recognizing that "the stretch of this protection is theoretically endless,"[177]

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amendment right of the newspaper. Again, Justice Stewart dissented on the basis of his theory in *Branzburg*. *See Zurcher,* 436 U.S. at 572. As Professor Blasi has observed, Justice Stewart's views in these various opinions represented "a sharp distinction between the claim to freedom from government interference with source relationships that reporters have established on their own and the contention 'that the Constitution imposes upon government the affirmative duty to make available to journalists sources of information not available to members of the public generally.' " Blasi, *supra* note 150, at 596 (quoting *Pell,* 417 U.S. at 834). Professor Blasi concludes that Justice Stewart's concern was for the "institutional autonomy of the press rather than the immediate effect subpoenas might have on the flow of information." *Id.* A concern for institutional autonomy would explain why Justice Stewart did not think that affirmative "information-gathering" rights were needed to assure this autonomy. *See* Baker, *Commercial Speech: A Problem in the Theory of Freedom,* 62 IOWA L. REV. 1, 32 (1976) [hereinafter Baker, *Commercial Speech*] (asserting that a denial of protection would "imperil the vital independence" of the press); Baker, *Press Rights and Government Power to Structure the Press,* 34 U. MIAMI L. REV. 819 (1980) [hereinafter Baker, *Press Rights*] (discussing the differences between "defensive" and "offensive" rights of the press as concerns the government). *See generally* Stewart, *"Or of the Press,"* 26 HASTINGS L.J. 631, 635-37 (1975) (asserting that there is no constitutional right to have access to particular government information). Professor Baker presents an argument that, among other things, supports institutional autonomy for the press. Neither the views of Justice Stewart nor Professor Baker necessarily support what would in essence be "access" rights for experimenters. *See infra* note 200.

In Gannett Co. v. DePasquale, 443 U.S. 368 (1979), the Court held that the press did not have an affirmative right to attend a pretrial proceeding because "the constitutional guarantee of a public trial [under the sixth amendment] is for the benefit of the defendant." *Id.* at 381. The Court did not decide whether the first amendment required access because "assuming, *arguendo,* that the First and Fourteenth Amendments may guarantee such access in some situations, a question we do not decide, this putative right was given all appropriate deference by the state *nisi prius* court in the present case." *Id.* at 392.

[172] *Richmond Newspapers,* 448 U.S. at 582 (Stevens, J., concurring).

[173] *Id.*

[174] *See infra* notes 181-82 and accompanying text.

[175] *Richmond Newspapers,* 448 U.S. at 586-87 (Brennan, J., concurring). This appears to be the focus of Professor Robertson's argument on the right to receive information. *See supra* notes 99-109 and accompanying text.

[176] *Richmond Newspapers,* 448 U.S. at 588 (Brennan, J., concurring).

[177] *Id.* (quoting William J. Brennan, Jr., *Address,* 32 RUTGERS L. REV. 173, 177 (1979)).

Justice Brennan observed that "[a]n assertion of the prerogative to gather information must accordingly be assayed by considering the information sought and the opposing interests invaded."[178] He offered two principles to determine whether the denial of access in any particular case implicated first amendment values:

> First, the case for a right of access has special force when drawn from an enduring and vital tradition of public entree to particular proceedings or information. . . . [Second,] what is crucial in individual cases is whether access to a particular government process is important in terms of that very process.[179]

The Court adopted a version of Justice Brennan's framework in *Globe Newspaper Co. v. Superior Court,*[180] a case which involved a statute that excluded the general public from trials concerning certain sexual offenses involving minor victims. The Court required that the two principles espoused by Justice Brennan in *Richmond Newspapers* be satisfied to find that the assertion of the prerogative to gather information triggers first amendment concerns.[181] If the principles are satisfied *and* if the state attempts to deny the right to access "to inhibit the disclosure of sensitive information, [then] it must be shown that the denial is necessitated by a compelling governmental interest, and is narrowly tailored to serve that interest."[182]

Several observations may be made concerning the application of the recent information-gathering cases to experimentation that does not involve communication. First, the access cases are generally cases in which "[t]he only issue posed is as to the right of [the] press or public

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[178] *Id.* Justice Brennan further stated that, "[t]his judicial task is as much a matter of sensitivity to practical necessities as it is of abstract reasoning." *Id.*

[179] *Id.* at 589 (citation omitted). "What countervailing interests might be sufficiently compelling to reverse [the] presumption of openness need not concern us now, for the statute at stake here authorizes trial closures at the unfettered discretion of the judge and parties." *Id.* at 598. (citing United States v. Nixon, 418 U.S. 683, 714-16 (1974), for an example of possible countervailing national security concerns).

[180] 457 U.S. 596 (1982).

[181] *Id.* at 603-06.

[182] *Id.* at 606-07. This framework has been followed in subsequent access cases dealing with public attendance during the voir dire of jurors in a criminal case and during the preliminary hearing in a criminal case. *See* Press-Enter. Co. v. Superior Court, 106 S. Ct. 2735, 2740-41 (1986); *see also* Waller v. Georgia, 467 U.S. 39, 44-47 (1984) (holding that when the defendant wants a suppression hearing to be open, the sixth amendment requires that the party seeking closure meet tests espoused by first amendment access cases). In his dissent in *Press-Enter. Co.,* Justice Stevens argued that "[t]he cases denying access have done so on a far lesser showing than that required by a compelling governmental interests/least restrictive-means analysis . . . ." 106 S. Ct. at 2751 (Stevens, J., dissenting).

to be in . . . physical propinquity" with an event that itself involves communication such as the testimony of a witness or the responses of a juror.[183] It is questionable whether these situations can or should be extended to all information-gathering events that an individual seeks to initiate. Nevertheless, the access cases clearly do protect some noncommunicative conduct, such as the actual access to certain physical facilities by the press and public.

Second, the cases only involve access to government proceedings where the participation of the public and press has been recognized as an important part of those political and governmental processes.[184] There are dicta in the access cases, however, that would extend beyond this narrow scope to include those rights "necessary to the enjoyment of other First Amendment rights."[185] Even assuming that the *Richmond Newspapers* principles apply to situations beyond access to the governmental processes involved in the actual cases and that an experimenter could satisfy these principles with the claim that experimentation is an indispensable condition of meaningful communication, the framework that the Court has adopted in the access cases would nevertheless not provide prima facie first amendment protection to all information-gathering conduct. Before first amendment scrutiny even applies, the Court requires that claims of protected information-gathering satisfy the *Richmond Newspapers* principles *and* that the denial to gather information be made in order to inhibit the dissemination of sensitive information.[186] If state regulation of even indispensable experimentation were predicated on a concern for public safety or for the welfare of human and animal subjects and not on the content of the communication that the experimenters ultimately wished to disseminate, the regulation would not suffice to trigger heightened first amendment scrutiny.

The access framework adopted by the Court in *Richmond Newspapers* and *Globe Newspaper* reflects the practical concern that Justice

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[183] M. NIMMER, *supra* note 48, at § 4.09[B].

[184] For example, the plurality opinion in *Richmond Newspapers* appeared to rest, in part, on the notion that a criminal trial was a public forum. *See* 448 U.S. at 576 n.11 (Burger, C.J., plurality opinion) (distinguishing the courtroom in *Richmond Newspapers* from the prisons involved in Pell v. Procunier, 417 U.S. 817 (1974), and Saxbe v. Washington Post Co., 417 U.S. 843 (1974), on the basis that penal institutions are not " 'open' or public places").

[185] *Globe Newspaper,* 457 U.S. at 604 (quoting *Richmond Newspapers,* 448 U.S. at 579-80 & n.16 (Burger, C.J., plurality opinion); *id.* at 587-88 & n.4 (Brennan, J., concurring in the judgment). In *Globe Newspaper,* Justice O'Connor concurred in the judgment on the basis that *Richmond Newspapers* held that "the First Amendment protects the right of press and public to attend criminal trials. I do not interpret that decision to shelter every right that is 'necessary to the enjoyment of other First Amendment rights.' " *Id.* at 611 (O'Connor, J., concurring) (quoting *id.* at 604).

[186] *See supra* notes 179-85 and accompanying text.

Powell articulated in his dissenting opinion in *Saxbe v. Washington Post Co.*:[187] "It goes too far to suggest that the government must justify under the stringent standards of First Amendment review every regulation that might affect" the gathering of information.[188] For example, in *Dietemann v. Time, Inc.*,[189] the media defendants, working with local law enforcement officials, gained entrance to the plaintiff's home through subterfuge and engaged in electronic and photographic surveillance of the plaintiff without his consent. The plaintiff, a plumber who claimed to be a scientist engaged in healing through the use of clay, minerals, and herbs, subsequently sued for invasion of privacy.[190] The media defendants claimed that their activities constituted news-gathering protected by the first amendment. The Ninth Circuit denied the claim, holding that "[t]he First Amendment has never been construed to accord newsmen immunity from torts or crimes committed during the course of newsgathering."[191] The court did not require that the application of tort law serve a "substantial" or "compelling" state interest; the first amendment simply was not implicated.[192]

The problem with the general view is that it seeks a presumption of first amendment protection for all experimental activity on the ground that it is indispensable information-gathering. But such a presumption is not justified by existing case law, which suggests that information-gathering, divorced from the actual processes of communication that are protected by traditional first amendment doctrine, is limited to instances where the government's primary concern is the context of any ultimate dissemination of information.[193] In protected speech contexts,

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[187] 417 U.S. 843 (1974).

[188] *Id.* at 860 (Powell, J., dissenting).

[189] 449 F.2d 245 (9th Cir. 1971).

[190] *Id.* at 245-46.

[191] *Id.* at 249.

[192] *See id.* at 250.

[193] Those who subscribe to the general view may argue that by admitting the applicability of heightened first amendment scrutiny in certain circumstances (when the government seeks to regulate experimentation that itself involves communication or when the purpose of government regulation of nonexpressive knowledge acquisition is to suppress ultimate expression). The analysis herein implicitly recognizes that at least some experimentation is itself protected by the first amendment. With respect to the regulation of experimentation that itself involves communication, it is clear that the status of the activity as experimentation is irrelevant to the first amendment protection that the activity would receive. *See supra* note 84 and accompanying text. In cases in which the first amendment would apply to analyze the regulation of nonexpressive facilitative conduct, the matter becomes more difficult. For example, assume that the state sought to regulate experimentation because of a fear that it would lead to "immoral" information. Assume further that the experimenter who challenged this regulation did not herself intend to publish the results but instead planned to provide them to her employer who would publish them. This Article's analysis would provide for heightened scrutiny of the regulation in such an instance.

or where access restrictions are concerned with inhibiting the ultimate dissemination of information, regulations are automatically subjected to heightened scrutiny, and content regulation may be fatal. If, however, noncommunicative and purely facilitative conduct is involved, then state regulation of that conduct falls within the scope of first amendment protection only in certain instances. If the access cases do protect exper-

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A critic might argue that the particular experimenter would have standing to raise a claim only if her own experimentation, the results of which would be published by someone else, were itself protected. The response to any such claim is that if the government seeks to regulate experimentation in order to suppress the ultimate dissemination of information derived from research, then the first amendment is applicable not because the experimentation per se is protected, but because the regulation is intended to suppress activity that *is* per se protected—the dissemination of information. In most if not all instances, those who engage in research do so with the intent to publish the results themselves or, at least, to disseminate the results to colleagues, students, or employers. In the example offered above concerning the experimenter who did not intend to publish the information herself, she nevertheless intended to disseminate the results to her employer and, therefore, she could challenge the speech-suppressive regulation. In the highly unlikely event that the experimenter could somehow be characterized as not intending to disseminate *in any way* the results of an experiment even to some other ultimate disseminator, then it would seem as though the nondisseminating experimenter would still have standing to challenge the regulation even under the restrictive standing principles espoused in Broadrick v. Oklahoma, 413 U.S. 601 (1973).

In *Broadrick,* the Court discussed the "departure from traditional rules of standing in the First Amendment area," *id.* at 613, that permits "attacks on overly broad statutes with no requirement that the person making the attack demonstrate that his own conduct could not be regulated by a statute drawn with the requisite narrow specificity." *Id.* at 612 (quoting Dombrowski v. Pfister, 380 U.S. 479, 486 (1965)). The Court further stated that, "where conduct and not merely speech is involved, we believe that the overbreadth of a statute must not only be real, but substantial as well, judged in relation to the statute's plainly legitimate sweep." *Id.* at 615.

If the statute challenged by a nondisseminating experimenter is intended to suppress speech, then it may be assumed that in all or substantially all of the instances in which the statute is applied, the purpose of regulation will be to suppress publication itself, and the regulation will have no countervailing "plainly legitimate sweep" to justify precluding an attack on overbreadth grounds. In addition, to the extent that the nondisseminating experimenter may at some later time wish to disseminate the results of the experiment, she is a potential disseminator of the information.

In the context of state legislation directed at experimentation, virtually all conceivable claimants will be involved in what they will characterize as information-gathering activities leading to dissemination, and virtually no claimant will be in the position of, for example, someone who does not intend to engage in expression but nevertheless challenges state legislation aimed at expressive activity. It must be emphasized that any application of the first amendment to such a challenge by a disseminator would not be a recognition that the experimentation is itself protected, but only that the government regulation of experimentation was a pretext for the impermissible suppression of speech. In the unlikely context of the overbreadth challenge described above, the Court in *Broadrick* recognized that the primary application of the overbreadth doctrine involved instances in which the state regulated pure speech or, to a much lesser degree, expressive conduct. Any successful challenge to a speech-suppressive regulation by a nondisseminating experimenter must be predicated upon the impact of the regulation on protected speech and is not a recognition that the experimentation is itself protected activity.

imentation, then they do so only when the state concern in regulating that conduct is related to the content of the ultimate communication. If the state were to regulate genetic experimentation because of a concern that the ultimate information derived and disseminated would be "immoral" in some sense, then perhaps the first amendment would be triggered. But if the state were to regulate purely facilitative conduct for nonspeech reasons, such as the protection of animal subjects from cruel treatment—a traditional concern of both state and federal legislation[194]—then the first amendment would not even be implicated.

Finally, even if the access cases did provide prima facie protection for experimentation, the same problem that plagues the general precondition argument still pertains: what experimental activity is to be protected?[195] This problem of formulating a limiting principle[196] may be stated in a way that reflects the peculiar context of news-gathering. In *Branzburg,* the issue was the exemption of the press from laws of general application not related to the ultimate dissemination of information.[197] The Court focused on the problem of determining who would benefit from such an exemption, given the reality that academic researchers and others performed information-gathering functions.[198] Consequently, the Court held that members of the press, like members of the public, were required to respond to grand jury subpoenas and to answer questions relevant to an investigation into the commission of a crime.[199] In access cases, however, the Court has avoided this problem by indicating that the right of access is the *public's* right to know, and

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[194] *See, e.g.,* Animal Welfare Act, 7 U.S.C. §§ 2131-2155 (1982 & Supp. III 1985); CAL. CIV. CODE § 1834 (1985) ("A depositary of living animals must provide them with suitable food and shelter, and treat them kindly."); R.I. GEN. LAWS § 4-1-2 (1987) ("Whoever shall . . . torture, torment, deprive of necessary sustenance, cruelly beat, mutilate or cruelly kill . . . any animal . . . shall . . . be imprisoned . . . or be fined . . . or be both imprisoned and fined . . . .").

[195] Is the "experimenter" digging for Atlantis gathering information in a way that requires any regulation of her conduct to satisfy the first amendment? *See supra* note 165 and accompanying text.

[196] The problem of formulating a limiting principle will be explored in depth in section B of this Part.

[197] *Branzburg,* 490 U.S. at 690-91.

[198] *See id.* at 703-05. There have been a number of essays written concerning the problem of "defining" the "press" for purposes of determining the ambit of access rights. *See, e.g.,* Abrams, *The Press Is Different: Reflections on Justice Stewart and the Autonomous Press,* 7 HOFSTRA L. REV. 563, 581 (1979) ("[I]t is difficult to comprehend why the difficulties in defining 'press' should lead to the conclusion that no uniquely 'press' protections may be afforded [under the first amendment]."); Lange, *The Speech and Press Clauses,* 23 UCLA L. REV. 77, 106 (1975) ("[I]t is still unlikely . . . that we will succeed in defining the press in ways which will prove satisfactory in recognizing separate rights under the press clause.").

[199] *See Branzburg,* 490 U.S. at 709.

not the right of the press to gather information.[200] The right of access is

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[200] *See, e.g., Globe Newspaper,* 457 U.S. at 606 ("Public scrutiny of a criminal trial enhances the quality and safeguards the integrity of the factfinding process, with benefits to both the defendant and to society as a whole."). It may be argued that cases like *Branzburg* and Zurcher v. Stanford Daily, 436 U.S. 547 (1978), would present *less* difficulty in defining the scope of recipients of any exemption because those cases have consistently involved what Professor Baker labels "defensive" rights. *See* Baker, *Press Rights, supra* note 171, at 839. Professor Baker argues that "the press clause gives the press defensive protection against various forms of government interference that restrict or impede its ability to carry out its checking and its informative function." *Id.* at 838. Defensive rights are those that "protect press enterprises . . . from government appropriation and interference. Offensive rights give the press enterprise or the reporters special rights of action or special rights to obtain materials outside the institutional boundaries of the press." *Id.* at 839. Although Professor Baker recognizes that "[d]istinctions between defensive and offensive rights are obviously somewhat conventional because they necessarily rest on our culturally based understanding of institutional boundaries," *id.,* he concludes that access rights would be classified as offensive rights and would not be necessary to promote the institutional autonomy of the press. *Id.* at 842; *see also supra* note 171. To the extent that some courts have protected experimenters from responding to subpoenas in civil contexts, such protection would, at most, indicate only the acceptance of a defensive right to ensure the institutional autonomy of researchers and not an offensive right to protect the experimental activity of the researchers. *See supra* note 11.

According to Professor Baker, limiting the press clause to protection of "defensive" rights would simplify the problem of identifying the beneficiaries of protection under the press clause:

> When the government attempts to regulate communication enterprises or solicit testimony from people who, at the time of the government inquiry, have evidenced an involvement with the press and whose testimony relates to that involvement, the task of identifying the press becomes plausible. Of course, definitional problems remain . . . . These, however, are questions to which one can address reasoned arguments rather than speculations about unformed motivation and unknown future behavior, speculations one must face when analyzing offensive rights [such as a right of access].

Baker, *Press Rights, supra* note 171, at 841 (footnote omitted). This is not to say that Professor Baker's framework would translate into protecting "defensive" rights for experimenters or rights, denied in cases like *Branzburg,* that would ensure institutional autonomy for experimenters. Professor Baker makes clear that his theory is restricted only to protection of the press as a constitutionally recognized institution that is instrumentally useful for exposing government abuse. *Id.* at 834. Indeed, Professor Baker analogizes the press clause to the establishment clause and suggests that each involves preservation of institutional autonomy. *Id.* at 825-28. The problem is that the current relationship between government and "accepted" scientific practice makes a concern for institutional autonomy very unrealistic. In an important essay, Professor Goldberg discusses the legal standard developed under establishment clause jurisprudence and observes that "[b]y this [standard], federal spending for science indicates that government and science are not merely entangled; they are fused." Goldberg, *Constitutional Status, supra* note 2, at 27. Professor Goldberg argues that Congress "may legislate the establishment of science" and, indeed, has done so. *Id.* at 17. The entanglement between science and government means that it would be useless to assign to scientists a "checking" role. *See* Blasi, *supra* note 150, at 528. The government funds most of what might arguably be called "basic" research. *See* Goldberg, *Constitutional Status, supra* note 2, at 27. In this context, attempting to delineate "defensive" rights would be a largely futile endeavor.

very narrow, but it is not a right held by members of a group that require special identification.

The general view's reliance on dicta in *Zemel* and *Branzburg* exposes a major flaw in its reasoning.[201] Even if the first amendment protects some noncommunicative conduct indispensable for the dissemination of ideas, not every information-gathering claim need be subject to heightened first amendment scrutiny.[202] But no commentator who supports the first amendment status of experimentation would argue that *every* regulation of information-gathering activity need pass first amendment hurdles. Rather, the claim would go, only those restrictions on "scientific" experimentation need be closely scrutinized. No justification can be made, however, for treating the preconditions of "scientific" speech any more favorably than those of other types of speech.[203] Moreover, even if preconditions of scientific speech were to be viewed differently, the problem of developing criteria to identify protected activities remains.

For example, placing fully conscious dogs in microwave ovens at temperatures of 105°F until the dogs died would constitute a violation of most state anticruelty laws.[204] The general view would accord first amendment protection to this activity, which was funded by the Department of Energy in 1983,[205] as scientific information-gathering. Under its approach, the government could regulate such activity only if it demonstrates a "compelling" interest or, at least, satisfies the balanc-

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In the access cases, which involve an "offensive" right of gathering information, the Court obviated the problem of defining "the press" by allocating any affirmative access rights to the public, and to the press only as provider of information to the public. The access right is carefully circumscribed and, as the cases clearly indicate, not all claims of information-gathering are subject to first amendment analysis. To the extent that the general view seeks to rely on protection of news-gathering, it implicitly seeks to create an "access" right that would in effect require that "access" be granted to a particular group—scientists—while presumably denied to all others. Where the state seeks to protect public safety or the health and welfare of human or nonhuman animal research subjects, the right sought by experimenters is clearly an "offensive" right in that experimenters seek cooperation from the government in exempting their activities from regulations that are generally applicable and, in any event, are not directed at the suppression of any ultimate dissemination. *See* Baker, *Press Rights, supra* note 171, at 840.

[201] *See supra* notes 168-71 and accompanying text.

[202] *See supra* notes 186-92 and accompanying text.

[203] *See supra* text accompanying note 159.

[204] *See* ANIMAL LEGAL DEFENSE FUND, SUBMISSION ON PAIN AND ANESTHESIA WITH REFERENCE TO THE IMPROVED STANDARDS FOR LABORATORY ANIMALS ACT OF 1985, at 14 (1986) (report submitted to U.S. Dep't of Agric.); *cf.* State v. Tweedie, 444 A.2d 855 (R.I. 1982) (placing cat in microwave oven violated state humane statute even when animal lived briefly after being removed from oven).

[205] ANIMAL LEGAL DEFENSE FUND, *supra* note 204, at 14.

ing test prescribed by *O'Brien*.[206] Surely, the general view does not argue that anyone ought to have a first amendment right to kill conscious dogs in microwave ovens; it must mean that only "scientists" can claim that right.

3. Experimentation as Providing the Meaning of Scientific Expression

The third argument that surfaces in the general view is that scientific speech can have "significance or meaning . . . only if the data have been gathered in certain rigorous ways."[207] It argues that, "[e]xperimentation and fact gathering are critical to the scientific process in more than the sequential sense; they are also essential to the integrity of scientific expression."[208] The importance of pure scientific speech is that it facilitates experimental methodology through dissemination of information by scientists.[209]

This third argument appears to rest on several dubious assertions about the nature of contemporary scientific research. First, it is an exaggeration to characterize experimentation as a necessary and sufficient condition to the meaning of all scientific speech. Even if some experimentation is necessary under the hypothetico-deduction model of hypothesis testing, "experimentation is not a *sine qua non* of scientific

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[206] Dresser, *supra* note 2, at 1191. Professor Dresser accepts that the first amendment protects animal experimentation and that only a "compelling" state interest will justify restriction on the methods of experimentation.

[207] Robertson, *Scientist's Right, supra* note 2, at 1205. Professor Goldberg has articulated the importance of testing:

> A scientist can come up with a hypothesis about the natural world through any process at all—systematic study, inspired speculation, or fevered dreams. But that hypothesis must ultimately be subject to controlled tests, reproducible by others. Only if the tests support the hypothesis can the hypothesis be accepted. A new hypothesis that explains important matters not previously understood will eventually be accepted enthusiastically by other scientists.

Goldberg, *Reluctant Embrace, supra* note 2, at 1342-43.

[208] Delgado & Millen, *supra* note 2, at 378.

> "Reputable scientific journals will not publish a researcher's findings unless they are accompanied by a description of the verifying experimentation sufficiently detailed to allow others to duplicate the procedure. [This practice is different from that of] [r]eporters [who] may write credible stories based on partial information, informed speculation, and information from anonymous sources . . . ."

Id.

[209] *See, e.g.*, Ferguson, *Scientific Expression, supra* note 2, at 536-41 (arguing that the pure speech of experimenters is protected because such speech facilitates the *process* of science).

testing."[210] Experimentation may be "physically impossible . . . [and] logically inappropriate."[211] Second, the argument assumes that there is a free flow of scientific information among members of the scientific community. This assumption ignores the proprietary interest in discoveries and the competitiveness among researchers that militate against such uninhibited dissemination.[212] Finally, the argument assumes that the difference in importance of information-gathering to experimenters and journalists is a difference of degree: experimenters need information more than journalists.[213] But this assumption is also unjustified. Even if a group's greater need for information were relevant for first amendment purposes, there is simply no reason to accept that information-gathering is more important for scientists than for journalists. Much scientific discourse does not depend on experimentation; most journalism does depend on information-gathering.

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[210] G. KNELLER, *supra* note 138, at 116. Professor Kneller describes the hypothetico-deduction model as involving the deduction of predictions from particular hypotheses or theoretical statements. *See id.* at 113.

Professor Delgado and Mr. Millen argue that there is a logical connection between experimentation and speech because without experimentation, we would not credit such speech as being "scientific." *See* Delgado & Millen, *supra* note 2, at 378. This argument assumes both that all scientific speech is derived from experimentation, which is questionable even under current norms of science, and that in those instances in which speech is in some sense derived from experimentation, the technical norms of traditional science are necessary and not contingent. *See infra* notes 297-301 and accompanying text. In addition, the argument assumes the relevance, for first amendment purposes, of any "logical" connection between experimentation and scientific speech. But just because some conduct may serve to validate or to accredit protected speech, that does not mean that the conduct receives first amendment protection.

The "logical connection" argument of Professor Delgado and Mr. Millen is related to the position that the first amendment must protect the generation of ideas, or "mentation," because mentation and protected speech are logically connected. *See* Delgado & Millen, *supra* note 2, at 371-73. There is support in the case law and in scholarly comment for the proposition that the first amendment protects mentation. *See, e.g.*, Kaimowitz v. Department of Mental Health, 1 ABA Mental Disability L. Rep. 147, 151 (Mich. Cir. Ct. July 10, 1973) ("To the extent that the First Amendment protects the dissemination of ideas and expression of thoughts, it equally must protect the individual's right to generate ideas."); *see also* Shapiro, *Legislating the Control of Behavior Control: Autonomy and the Coercive Use of Organic Therapies,* 47 S. CAL. L. REV. 237, 256 (1974) (listing arguments to support the proposition that the first amendment protects ideas). Even if the first amendment does protect some right of mentation, that does not mean that such a right supports protection for experimentation. A right of mentation would presumably protect all thought and not just the thought of "scientists," and, therefore, it would not be necessary to determine which persons hold the right. Moreover, a right of mentation does not imply that the first amendment provides at least prima facie protection to any conduct that gives rise to thought.

[211] G. KNELLER, *supra* note 138, at 116. Many scientific publications articulate theoretical propositions that cannot be tested or discuss hypotheses that have not yet been tested.

[212] *See supra* notes 96, 142-47 and accompanying text.

[213] *See* Delgado & Millen, *supra* note 2, at 378.

There is, however, no doubt that prevailing scientific norms emphasize the importance of at least *some* experimentation and that, according to those norms, certain empirical assertions are derived from the use of experimental methodology. The general view expresses this relationship between speech and methodology by arguing that speech and experimental preconditions are inextricably linked. If particular research does involve experimentation, then experimental methodology "dictates with absolute authority the form in which all scientific articles and textbooks are written."[214]

Professor Ferguson offers the clearest articulation of this third approach, arguing that scientific and technological expression, as *categories* of pure speech, require protection because of the "incalculable social value" that scientific knowledge represents.[215] Professor Ferguson argues that free scientific expression "promotes the discovery of scientific truth," claiming that "the well-known 'free market of ideas' theory" is applicable to the domain of science.[216] As part of his argument, Professor Ferguson notes that "[l]ying at the heart of the scientific method . . . is a process of rigorous testing in which statements, ideas, and theories are published for critical evaluation and thereby exposed to the 'hazard of refutation.' "[217] To ensure the operation of scientific method, Professor Ferguson concludes, scientific expression should be protected.[218]

This argument goes beyond the position that experimentation is indispensable for the dissemination of scientific expression. Instead, the experimental precondition is *itself* a value to be protected, and speech is vital to that protection. Scientists manifest their "belief" in theories by conducting experiments in conformity with those theories, but the conduct of the experiments, in accordance with scientific method, is itself a highly important value. Assertions about theory are only meaningful in light of experimental conduct.[219] This argument for protection of experimentation does not seek to portray experimentation as expressive conduct or *merely* as conduct indispensable for the more highly valued communication. Rather, the conduct itself is viewed as a primary value.

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[214] W. BROAD & N. WADE, BETRAYERS OF THE TRUTH 127-28 (1982).

[215] Professor Ferguson states: "After all, scientific advances not only contribute to the collective wisdom of the culture, but also make possible practical applications that improve the quality of modern life." Ferguson, *Scientific Expression, supra* note 2, at 536.

[216] *Id.* at 536-37.

[217] *Id.* at 538 (quoting K. POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY 280 (1968) [hereinafter K. POPPER, LOGIC]).

[218] *Id.* at 539 ("Clearly, then, a system of free scientific expression is essential to the operation of the scientific method.").

[219] *See id.* at 539-41.

Even with respect to empirical assertions that are derived from experimental methodology, the argument fails. The status of experimentation as a primary activity sought to be protected, irrespective of whether experimentation provides the social benefits claimed by the general view, is irrelevant to its first amendment status. For example, farming is an activity that undoubtedly provides great social benefit and is regarded as an important activity by farmers as well, but that does not make farming an activity protected by the first amendment. The importance of an activity either to the group of people who engage in the activity or the group of people who supposedly benefit from it is usually irrelevant for purposes of using the first amendment to protect the activity.

The salient exception to this lack of protection for valued activity is protection accorded to the free exercise of religion under the first amendment.[220] Religious activities, however, are protected not because

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[220] The relationship between religious conduct and religious belief is close to the relationship between protected speech and experimentation suggested by the third argument. The religious context employs a distinction between "belief" and "conduct" ostensibly similar to the distinction between "speech" and "action." It is clear that the first amendment protects at least some religious conduct just as it protects at least some expressive conduct of a nonreligious nature. *See, e.g.,* Sherbert v. Verner, 374 U.S. 398, 410 (1963) (A state cannot "constitutionally apply the [unemployment] eligibility provisions so as to constrain a worker to abandon his religious convictions respecting the day of rest."). Religious activity does not merely "facilitate" religious belief in the way that access facilitates news-gathering; in many religions, the religious activity is considered at least as important as belief per se. According to the third argument, experimentation is similarly connected to protected speech so that the experimentation is as important as the speech itself. Furthermore, the speech is protected, at least in part, because it facilitates experimental methodology. *See* Ferguson, *Scientific Expression, supra* note 2, at 536-41.

The salient difference between the religion context and the science context, apart from the fact that religion is explicitly protected by the first amendment, is that in free exercise cases, the Court does not usually define "religion" in the way that it would have to define "science" if scientific experimentation were protected. Although the Court has acknowledged that it is possible to "imagine an asserted claim so bizarre, so clearly nonreligious in motivation, as not to be entitled to protection under the Free Exercise Clause," Thomas v. Review Bd., 450 U.S. 707, 715 (1981), the Court has also recognized that the judiciary is "ill equipped," *id.,* to define "religion" or to decide issues of scriptural interpretation. *See, e.g.,* United States v. Lee, 455 U.S. 252, 257 (1982) ("It is not within 'the judicial function and judicial competence' . . . to determine the proper interpretation of the Amish faith." (quoting Thomas v. Review Bd., 450 U.S. 707, 715-16 (1981))); United States v. Ballard, 322 U.S. 78, 86-87 (1944) ("Heresy trials are foreign to our Constitution."). In Wisconsin v. Yoder, 406 U.S. 205 (1972), the Court acknowledged that "the very concept of ordered liberty precludes allowing every person to make his own standards on matters of conduct in which society as a whole has important interests." *Id.* at 215-16. In this context, however, the Court only distinguished between religious belief and "secular values," *id.* at 216, but did not attempt to define "religion." Some lower courts have presented "definitions" of religion. *See, e.g.,* Africa v. Pennsylvania, 662 F.2d 1025, 1032 (3d Cir. 1981) (pursuant to defining nontraditional religious beliefs, courts may compare by "analogy" that

of their instrumental value to the achievement of truth in the marketplace of ideas, but because the first amendment recognizes and protects certain substantively valued conduct central to the practice of religious beliefs. One can argue, of course, for the protection of experimentation as substantively valued conduct, but such an argument does not comport with the marketplace theory upon which the general view rests.[221]

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belief with more traditional religious doctrines), *cert. denied,* 456 U.S. 908 (1982). For a criticism of the process of attempting to "define" religion, see Freeman, *The Misguided Search for the Constitutional Definition of "Religion,"* 71 GEO. L.J. 1519 (1983). Neither reluctance to define religion nor reluctance to interpret religious doctrine would preclude an inquiry into the sincerity of assertions of the free exercise of religion. *See, e.g.,* Welsh v. United States, 398 U.S. 333, 343-44 (1970) (Black, J.) (holding that a sincerely held belief in the "immorality" of war meant that an individual was "clearly entitled to a conscientious objector exemption"). There is no doubt that some of the Court's reluctance to engage in definitional or interpretive analysis is based upon concerns relating to the establishment clause. *See, e.g., Ballard,* 322 U.S. at 86 (the first amendment "forestalls compulsion by law of the acceptance of any creed of the practice of any form of worship" (quoting Cantwell v. Connecticut, 310 U.S. 296, 303 (1940))). But there is also no doubt that the Court correctly recognizes that "it is not within the judicial function and judicial competence to inquire" into the truth of religious beliefs. *Thomas,* 450 U.S. at 716.

[221] Several theorists suggest that experimentation might be protected as involving the realization of the experimenter's "interest in personal expression," Robertson, *Scientist's Right, supra* note 2, at 1215, or her "self-fulfillment." Delgado & Millen, *supra* note 2, at 364-65. Professor Emerson argues that individual self-fulfillment is one of the values protected by freedom of expression. *See* T. EMERSON, *supra* note 7, at 6-9.

It is unclear whether these alternative theories of the first amendment may avoid the difficulties that plague any attempt to use marketplace theory to protect experimentation. For example, Professor Redish argues that "the constitutional guarantee of free speech ultimately serves only one true value[:]. . . 'individual self-realization.' " Redish, *supra* note 150, at 593. Self-realization includes "either . . . development of the individual's powers and abilities . . . or . . . the individual's control of his or her own destiny through making life-affecting decisions . . . ." *Id.* Although Professor Redish has not yet specifically addressed the issue of experimentation in any systematic way, he has written about the protection of scientific speech as a category and has concluded that scientific and technological expression—even if purely commercial—"is deserving of full first amendment protection, because it facilitates the exercise of one's private self-government and aids in the development of one's intellectual capacities, and thus contributes as much as other forms of protected expression to the first amendment value of self-realization." Redish, *Limits on Scientific Expression and the Scope of First Amendment Values: A Comment on Professor Kamenshine's Analysis,* 26 WM. & MARY L. REV. 897, 906 (1985) [hereinafter Redish, *Limits*]. Professor Redish's theory in this context is clearly instrumental in orientation, and as Professor Baker has pointed out in his criticism of Professor Redish's general defense of protection for commercial speech, "any justification for protection built on the contribution that corporate speech makes to individuals' self-rule is unpersuasive as long as it remains an open empirical and normative question whether this additional information actually promotes rational, intelligent self-rule." Baker, *supra* note 69, at 663. The same observation could be made about Professor Redish's defense of scientific expression. As long as the reason for its protection is predicated on the *indirect* contribution that expression (or experimentation) makes as a *category* of speech, it appears as though Professor Redish is forced to develop some limiting principle to determine what expression (or experimentation) would contribute *indirectly* to the first amendment values he articu-

To the extent that the general view seeks protection for experi-

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lates. *But see* Redish, *Self-Realization, Democracy, and Freedom of Expression: A Reply to Professor Baker,* 130 U. PA. L. REV. 678, 685 n.42 (1982) (stating that while the state may constitutionally limit an individual's power of self-rule, "the relevant point for first amendment purposes is that, for those activities in which we do allow the individual to make life-affecting decisions, it hardly makes sense to say that individuals have the authority to decide for themselves, but that we will allow or encourage only those decisions that are externally deemed 'rational' or 'intelligent.' "). Professor Redish maintains that his theory does not require any examination of whether expression actually advances self-realization. *See* Redish, *supra* note 150, at 627-29. This position appears inconsistent with Professor Redish's general emphasis on the indirect value of expression in first amendment theory.

Professor Baker has, in an extended series of articles, developed the "liberty theory" of the first amendment. *See, e.g.*, Baker, *Commercial Speech, supra* note 171; Baker, *supra* note 49; Baker, *Press Rights, supra* note 171; Baker, *supra* note 69. Professor Baker's theory is fundamentally different from that of Professor Redish in that it does not rely on the *indirect* value of expression. Rather, the liberty model protects both speech and conduct that *directly* "foster[] individual self-realization and self-determination without improperly interfering with the legitimate claims of others." Baker, *supra* note 49, at 966. Professor Baker argues that it is the source of speech and not its content that defines the ambit of protection. Hence, speech that does not represent voluntary or personal choice, such as commercial advertising, the content of which is determined by the market, is not protected. *Id.* at 996 & n.102. Although Professor Baker's liberty theory is extremely complex, his concern to protect *only* voluntary verbal and nonverbal conduct is itself highly relevant to the experimentation issue.

It was pointed out earlier that the complete merger of what might roughly be called "basic" science with what might roughly be called "applied" science or technology, and the requirements of both government funding agencies and industry, which often have similar instrumental goals and require useful "output" for their research support, have created an "industrialized" science. *See supra* notes 142-46 and accompanying text. It seems, therefore, unrealistic to look at experimentation as "expressive" in some simple sense. Moreover, the output of science is far from politically "neutral." *See infra* notes 297-301 and accompanying text. Established science promotes structurally determined values, and under liberty theory, individual autonomy and the right to control one's destiny support "the ability of people collectively to control, regulate, or restructure the autonomous workings of [such] social structures." Baker, *supra* note 69, at 655. Scientific expression, viewed realistically and not as either academic, morally-neutral truth-seeking or personally chosen and valued investigation, is very much "directed toward creating the world as 'profit' requires." Baker, *Commercial Speech, supra* note 171, at 15. It would seem that the only experimenters whose work is truly reflective of personal values are the elites that Ravetz describes as the "charmed circle of the successful men" who "pursue the researches they please in comfort." J. RAVETZ, *supra* note 139, at 47. Of course, some people may be able to finance their own activity, with no assistance from government or industry.

The reality of "industrialized" research suggests that under liberty theory it would be appropriate to ban the use of corporate or government funds for experimentation because "industrialized" science does not involve personally valued activity. In addition, all industrial experimentation would appear to be purely commercial under Professor Baker's analysis. It would be irrelevant whether the commercial experimentation occurred at the corporation or by contract with individuals who may or may not be located in universities. The motivation or personal beliefs of the experimenters are irrelevant when their beliefs do not determine their verbal or nonverbal conduct. Their expression cannot be characterized as personally chosen or personally valued. Furthermore, liberty theory ostensibly would not protect experimentation that occurs in response to government requirements. *See also infra* notes 349-53 and accompanying

mentation as an activity instrumentally valued for its contribution to the marketplace of ideas, the argument suffers from the same practical and theoretical defects exhibited by the general argument based on preconditions and by the more specific argument concerning information-gathering. If experimenters claim protection for those activities that they deem essential to the expression of various scientific theories, they would still need to limit such claims to some subgroup of practitioners. As Professor Ferguson recognizes, the experimental method "assumes the existence of an autonomous scientific community that serves as the sole judge of scientific merit and the final arbiter of scientific disputes."[222] Membership in that community is limited and members presumably would not accord protection to every experiment because not every experiment reflects prevailing scientific theories.[223] Some limiting principle would ostensibly be needed to identify *who* could claim first amendment protection. Further, the argument for protecting activity is based upon the instrumental value of scientific process to society.[224] No one, however, would claim that all instances of what might be labelled experimentation contribute to social benefit.

B. *The Formulation of a Limiting Principle*

None of the three arguments examined in the preceding section requires that experimentation be expression or expressive conduct in order to secure protection under marketplace theory. Rather, these arguments seek to protect experimentation as a noncommunicative precondition to the dissemination of protected expression. But the preced-

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text.

[222] Ferguson, *Scientific Expression, supra* note 2, at 538-40; *see also* Goldberg, *Reluctant Embrace, supra* note 2, at 1361.

[223] For example, experiments derived from the theoretical structures that underlie the "science of Creative Intelligence," creation science, parapsychology, or perhaps even acupuncture and holistic healing, would not qualify.

[224] Perhaps it is possible to avoid the need for a limiting principle by treating claims for protection of experimentation as no different from claims concerning the free exercise of religion. Some philosophers of science have argued that there is no logical distinction between belief frameworks in science and religion so that experimental conduct is as much a manifestation of an arbitrary belief system as is religious ceremony. *See, e.g.*, Feyerabend, *How to Defend Society Against Science,* in INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE 55, 55 (1980) ("[T]he most provocative statement one can make about the relation between science and religion is that science is a religion."). This solution to the problem of the need for some limiting principle would, of course, undercut completely the justification for protecting science based on the instrumental value of science to society by ignoring any inquiry into whether social value actually exists and by treating all scientific theories as tantamount to religious doctrine. Moreover, an additional difficulty with such a solution would be that the government could no longer financially support its preferred types of research because of establishment clause problems.

ing Section also argued that the first amendment does not generally protect noncommunicative preconditions of speech and that there is no support for the position that preconditions of scientific expression merit any protection greater than that accorded to other types of speech. Even if broad protection were extended to preconditions, however, courts would need to formulate a principle that limited protection. Protecting *any* activity that was characterized by *any* claimant as scientific would conflict with the basic utilitarian argument for protection of research upon which the general view rests—the social need for the free flow of socially beneficial information. Furthermore, even if *anyone* who sincerely claimed to be a scientist were to receive prima facie first amendment protection for her facilitative conduct, courts would still need to develop some limiting principle to balance the competing interests of the state and the scientist.[225] This section examines the difficulty in formulating a limiting principle that is not inimical to first amendment doctrine and concludes that, once an "objectivist" view of science is rejected, it is impossible to define such a limit in a content-neutral fashion. The general view not only seeks to distinguish scientific speech as more worthy of protection than other types of protected expression, but it also assumes that the preconditions of scientific expression can be identified in some manner acceptable under first amendment doctrine.[226] It necessarily assumes the existence of some constitutionally acceptable criterion that can identify scientific experimentation for the purpose of designating experimentation as protected at the outset of judicial evaluation of a regulation, or at the stage when competing interests are balanced.[227] To the general view, the traditional view of science, or at least of natural science, as yielding largely indisputable assertions about the universe entails the existence of this criterion. According to this characterization of science, scientific expression possesses epistemologically superior truth status;[228] more than other types of expression, science gives us confidence that if we protect it, together with the preconditions that facilitate it, we will move closer to the "truth."

Even if scientific information were epistemologically superior in terms of having a qualitatively different "truth" status, to characterize certain scientific information as true for the purpose of protecting only

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[225] Such balancing would presumably resemble that prescribed in *O'Brien,* 391 U.S. at 376-77. *See supra* note 19 and accompanying text.

[226] It should be remembered that even Professor Robertson, who ostensibly argues that *all* research should be protected, claims that "the case for first amendment protection [of scientific research] is all the more compelling." Robertson, *Scientist's Right, supra* note 2, at 1225 n.89.

[227] *See, e.g.,* Ferguson, *Scientific Expression, supra* note 2, at 536-41.

[228] *See infra* notes 241-69 and accompanying text.

some experimentation might pose problems for a marketplace theorist. After all, Mill, who provided the "best formulation"[229] of marketplace theory, explicitly defended the protection of false information so as not to deprive "the clearer perception and livelier impression of truth provided by its collision with error."[230] In certain respects, however, the general view seems to rest upon the notion that, although Mill's defense of falsity may be appropriate for political or ethical discourse, science is *different.* Although there may be no completely secure way of judging the truth of political or philosophical ideas, natural science allows us "to progress more certainly and more rapidly than other human endeavors to know the world"[231] by providing "a substantial body of hard-to-contest observation."[232] This notion may be called an "objectivist" view of scientific methodology.[233]

Although the "objective" theory of science is accepted by the general view and is to some degree reflected in the law, a critical analysis of science indicates both that the norms of the natural and social scientific communities are generated *within* those communities,[234] not imposed from without, and that these norms are not neutral grounds for showing with certainty whether a theory is true.[235] If experimentation

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[229] Baker, *supra* note 49, at 968 n.9.

[230] J.S. MILL, ON LIBERTY 76 (G. Himmelfarb ed. 1982).

[231] Wonnell, *supra* note 46, at 709.

[232] *Id.* at 713.

[233] This notion underlies Professor Emerson's characterization of the marketplace theory as reflecting the process of scientific methodology. *See supra* notes 33-35 and accompanying text. Scientific methodology produces truthful observations that can be repeatedly tested; although the outcome will be far less exact, the marketplace model contemplates that other areas of human knowledge will be likewise tested. It is also this notion that leads to skepticism about the marketplace theory of the first amendment, but to refusal to apply a "skeptical argument [about marketplace theory] . . . to challenge the rational basis for scientific procedures generally." *See* DuVal, *supra* note 46, at 191-92.

[234] *See* Goldberg, *Reluctant Embrace, supra* note 2, at 1361 ("[S]cience is in some respects a self-governing republic, with scientists deciding what is good work and what is not.").

[235] A recent and rather intriguing matter illustrates the division that can exist within the scientific community and how at least some researchers feel about the free speech rights of others. In 1981, Brigham and Women's Hospital, an affiliate of Harvard University, relieved Dr. John Darsee of his research responsibilities after discovering that Darsee "falsified data" in cardiological research involving animals. *See U.S. to Penalize Heart Researcher on Fraudulent Project at Harvard,* N.Y. Times, Feb. 16, 1983, at A1, col. 1. Two scientists from the National Institutes of Health (NIH), Walter Stewart and Ned Feder, subsequently examined the performance of 47 other scientists who were coauthors with Dr. Darsee on his published papers. The study concluded that 35 of these other researchers acted improperly by co-authoring papers with "obvious errors and discrepancies" and containing statements that they "knew or should have known" were false. *Major Study Points to Faulty Research at Two Universities,* N.Y. Times, Apr. 22, 1986, at C1, col. 4, C11, cols. 1-2. Stewart and Feder testified before a congressional subcommittee investigating the effect of libel laws

is to be protected, then there must be some appeal to prevailing norms of scientific methodology in order to impose some limit on the scope of that protection. As a practical matter, this appeal to prevailing norms of scientific methodology would have the effect of allowing an interest group comprised of practitioners of "accepted" science to determine when government regulation would be subject to increased scrutiny because first amendment concerns were implicated and when such regulation would be subjected to the more relaxed rational-basis standard. Such a state of affairs surely would implicate the concern that, to the extent possible, first amendment analysis should proceed in a content-neutral manner.[236] As Professor Emerson has observed, the marketplace theory would be invalid "only on the untenable premise that society already possesses all truth or on the authoritarian premise that only a single individual or small group can know and proclaim the truth."[237] If *only* the scientific community can define science for first amendment purposes, then allowing that community to do so would implicate Professor Emerson's authoritarian premise and the corresponding invalidity of the marketplace theory upon which the general view rests.[238] A related problem concerns the argument that "although science may be established in the sense that religion may not, the government nonetheless may not establish a particular scientific theory in the sense of forbidding private opposition to it."[239] The government is heavily involved

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on publication and stated that they were unable to get their study published. Lawyers who represented the researchers involved suggested to the 16 journals that showed interest in publishing the study that they might face libel suits if the study were published. At a later congressional hearing, Stewart and Feder testified that Daniel E. Koshland, Jr., editor of *Science,* the journal of the American Association for the Advancement of Science, "told us, during a telephone conversation . . . [that] our report was unsuitable for publication in his journal, that Science would be giving less coverage to scientific misconduct in the future than it has in the past." Sci. and Gov't Rep., June 1, 1986, at 1, col. 1. "Meanwhile, NIH has evicted Feder and Stewart from the spacious laboratory where for over a decade they have been researching nerve cells, and relocated them in a dingy, cramped basement room." Greenberg, *Want a Career in Science? Don't Blow the Whistle,* Wash. Post, May 18, 1986, at F7, col. 1 (editorial). Stewart observed that "[b]ased on the comments of other scientists, as well as our own personal experience, we think that if such studies [about misconduct by experimenters] are begun, attempts may be made to interrupt or censor them." *Misconduct by Scientists Said to Be More Common Than Many Believe,* Chron. Higher Educ., May 21, 1986, at 7, col. 1, 10, col. 2. The Stewart and Feder paper was finally published in the January 15, 1987 issue of *Nature.* Stewart & Feder, *The Integrity of the Scientific Literature,* NATURE, Jan. 16, 1987, at 207; *see* Murray, *A Long-Disputed Paper Goes to Press,* 131 SCI. NEWS 52 (1987).

[236] *See infra* note 325.

[237] Emerson, *supra* note 8, at 741.

[238] *See, e.g.,* Ferguson, *Scientific Expression, supra* note 2, at 539 (stating that the scientific method "assumes the existence of an autonomous scientific community that serves as the sole judge of scientific merit").

[239] Goldberg, *Constitutional Status, supra* note 2, at 29.

in financing experimentation.[240] If the prevailing views of protected ex-

[240] It is important to appreciate the relationship between government funding of science and the regulation of experimentation. The regulation of experimentation may occur as the result of allocational decisions made by the government in its financial support for certain experimentation or in its imposition of conditions on experimentation. Professor Shiffrin notes that "the government interest in favor of channeling scientific research seems compelling." Shiffrin, *Government Speech,* 27 UCLA L. REV. 565, 643 n.393 (1980). Professor Dresser, in her article on research involving nonhuman animals, accepts that the first amendment protects experimentation, but she correctly observes that the government may effectively set restrictions on both the content and manner of animal experimentation receiving federal funding. Dresser, *supra* note 2, at 1191. These restrictions may come in two forms. First, the government may choose not to fund research using nonhuman animals. Second, the government may impose conditions, such as the requirement that risk-benefit analyses be performed before experimentation or that consent be required, as is now the case with human experimentation funded by the government. In addition, any regulation by the government of its own "expression" through the experimentation of federal employees need only be "reasonable." *See* Snepp v. United States, 444 U.S. 507, 509 n.3 (1980) (enforcing contract requiring a CIA employee to submit all future writing for prepublication review).

A more interesting question is whether under the first amendment conditions could be imposed on *unfunded* experimentation as a requirement for receiving federal funds for other experimentation. Professor Robertson argues that the federal government may have authority to regulate all research conducted in institutions receiving any federal funds as long as the regulations are reasonably related to ensuring the ethical conduct of funded experimentation. *See* Robertson, *Scientist's Right, supra* note 2, at 1272-75. *But see* FCC v. League of Women Voters, 468 U.S. 364 (1984). In *League of Women Voters,* the Court invalidated a statute that prohibited a noncommercial educational broadcaster that received federal funds from editorializing because the statute affected editorializing not subsidized by federal funds. 468 U.S. at 399-401. This case may be inapplicable in the context of unfunded research because of the additional government interest in ensuring the ethical conduct of experimentation.

Professor Kreimer has provided a framework for analyzing the constitutionality of allocational arrangements. Specifically, he argues that it is necessary to distinguish threats—allocations "that make a citizen worse off than she otherwise would be because of her exercise of a constitutional right"—from offers—allocations that "merely expand her range of options." Kreimer, *Allocational Sanctions: The Problem of Negative Rights in a Positive State,* 132 U. PA. L. REV. 1293, 1300-01 (1984). Professor Kreimer proposes three "baselines" to assist in determining whether a particular allocation is a threat or an offer: history, or "[t]he use of the status quo ante," *id.* at 1359; equality, or "singling out a group for treatment less favorable than that accorded most comparable groups," *id.* at 1368; and prediction, or whether the allocation deviates from "the course of events that would follow if the government could not impose the condition in question," *id.* at 1372.

It is unclear how allocational arrangements affecting particular experimenters would fare under Professor Kreimer's analysis. For instance, experimenters might argue that an allocation violates the historical baseline because of past funding, but Professor Kreimer notes that "changing social or technological conditions [may] . . . necessitate or facilitate the provision of new benefits." *Id.* at 1363. Certain experimenters may argue that they are "singled out" for unfavorable treatment, but Professor Kreimer would accept that funding agencies making allocations consistent with their purpose (for example, to promote "good science") may reasonably decide that particular experimentation is not similarly situated to other experimentation. *See id.* at 1374-75. The problem here is that Kreimer seems to allow the relevant community of potential recipients to give content to the notion of agency "purpose." *See* Kreimer, *supra,* at 1374-75. Finally, experimenters might argue that they would be funded in the ordinary course, but the government might just as well decide to follow other traditional govern-

perimentation are derived in large part from government-funded science or by government acting in cooperation with industry, then the legal structure will effectively provide constitutional protection only for the type of science that the government has established.

The following subsection examines the "objectivist" view of science upon which the general view rests. Although the general view merely reflects the "crude empiricism" accepted in traditional legal doctrine, this Article explores how recent developments in the sociology of knowledge have cast considerable doubt on the objective view. It then demonstrates that rejection of the objective view renders impossible the formulation of any limiting principle. Without a limiting principle, marketplace theory, which undergirds the general view, cannot successfully protect scientific experimentation.

1. Crude Empiricism

In a recent review of essays critical of empiricism, Professor Crews defined empiricism as " 'scientific method' or a 'logic of verification'—a faith, that is, in the availability of neutral grounds for infallibly showing which of several hypotheses or theories is 'closest to the truth.' "[241] Professor Crews declares that this " 'foundationalist' empiricism has all but vanished in the past twenty years,"[242] and that "one might have to repair to the graveyard to find an authentic positivist to kick around."[243] Either Professor Crews believes that the legal system is one of the corpses resting in the graveyard, or he has overlooked that the legal system may be an important remaining defender of foundationalist empiricism.

A review of case law and legal scholarship reveals clearly that empiricism—indeed, crude empiricism—is still the dominant legal view of science and scientific method. This view is evident in cases that define patentable subject matter. For example, in *Diamond v. Chakrabarty*,[244] the Court stated that "[t]he laws of nature, physical phenomena, and abstract ideas have been held not patentable."[245] The

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mental interests, such as protecting the welfare of research subjects.

[241] Crews, *In the Big House of Theory* (Book Review), N.Y. REV. OF BOOKS, May 29, 1986, at 36, 37 (reviewing THE RETURN OF GRAND THEORY IN THE HUMAN SCIENCES (Q. Skinner ed. 1985)).

[242] *Id.* (footnote omitted). Professor Crews distinguishes between "foundationalist" empiricism and a weaker form of empiricism manifested as a "disposition to consult ascertainable facts when choosing between rival ideas." *Id.*

[243] *Id.*

[244] 447 U.S. 303 (1980).

[245] *Id.* at 309; *see also* Gottschalk v. Benson, 409 U.S. 63, 67 (1972) (denying patent for method of programming computers and implying that both mathematical

Court illustrated this point: "Einstein could not patent his celebrated law that $E = mc^2$, nor could Newton have patented the law of gravity. Such discoveries are 'manifestations of . . . nature, free to all men and reserved exclusively to none.' "[246] Similarly, in *Parker v. Flook*,[247] the Court explained that the laws of nature were not patentable because they describe relationships that have always existed in nature and their embodiment in a scientific "law" is the " 'mere' recognition of a theretofore existing phenomenon or relationship [that] carries with it no rights to exclude others from its enjoyment."[248] Laws and theories, then, are viewed as truths about the natural world that are available for everyone to find and to use.

Another context in which the supposedly defunct theory of empiricism apparently thrives involves the debate over whether state-required teaching of "creation-science" together with evolution theory violates the establishment clause of the first amendment.[249] In *McLean v. Arkansas Board of Education*,[250] the plaintiffs sought to enjoin enforcement of a statute that required public schools to give balanced treatment to creation-science, or "the scientific evidences for creation and inferences from those scientific evidences,"[251] and evolution-science, or "the scientific evidences for evolution and inferences from those scientific evidences."[252] Holding that the statute violated the establishment clause, the court decided that creation-science was not "science," which, according to the court, had the following "essential characteristics:" "(1) It is guided by natural law; (2) It has to be explanatory by reference to natural law; (3) It is testable against the empirical world; (4) Its conclusions are tentative; . . . and (5) It is falsifiable."[253] In a more

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formulae and scientific theories exist independently of those who merely uncover them); *supra* note 147 (reviewing the facts of *Chakrabarty* and critiquing Professor Carmen's analysis of the case).

[246] *Chakrabarty*, 447 U.S. at 309 (quoting Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948)).

[247] 437 U.S. 584 (1978). In *Parker*, the Court reversed the issuance of a patent on a method using a mathematical algorithm to alter alarm limits during transient catalytic conversion processes. *Id.* at 594-95.

[248] *Id.* at 593 & n.15 (quoting 1 P. ROSENBERG, PATENT LAW FUNDAMENTALS § 4 (1975)). The patent clause does extend protection under circumstances that may result in the patent holder, at least in theory, being able to enjoin experimentation by others. *See supra* note 147.

[249] *See* U.S. CONST. amend. I.

[250] 529 F. Supp. 1255 (E.D. Ark. 1982), *aff'd*, 723 F.2d 45 (8th Cir. 1983).

[251] 529 F. Supp. at 1264 (quoting ARK. STAT. ANN. § 80-1666 (Supp. 1981)).

[252] *Id.*

[253] *Id.* at 1267. The court in *McLean* noted:

> Several witnesses suggested definitions of science. One offered a descriptive definition that science is what is "accepted by the scientific community" and is "what scientists do." The obvious implication of this

recent creation-science case, *Edwards v. Aguillard*,[254] the Court invalidated a statute that, in significant part, had identical wording to the statute in *McLean*. The Court in *Edwards* did not attempt to define science, and instead held that the primary purpose of the statute was "to endorse a particular religious doctrine."[255]

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description is that, in a free society, knowledge does not require the imprimatur of legislation in order to become science.

Id. Some of the defendants' witnesses purported to be scientists. These witnesses, in conjunction with the defendants themselves, consistently characterized the defendants' evidence as "scientific." Nevertheless, the court went on to define science so as to exclude these views, thus withholding the imprimatur that the court stated was not necessary. *Id.* at 1267-69.

In many ways, the decision in *McLean* reflects the approach described by Professor Goldberg for distinguishing religion from science: "Although close cases can arise, the differences between religious and scientific endeavors—between, for example, faith and empirical verification—enable courts to perform their traditional task of determining if a given activity is religious in nature." Goldberg, *Constitutional Status, supra* note 2, at 28 n.182. Similar definitional problems appear in cases where the characterization of activity as "scientific" is important for tax purposes. *See, e.g.*, IIT Research Inst. v. United States, 9 Cl. Ct. 13, 31 (1985) (holding that research of nonprofit scientific research organization was scientific and thus income derived therefrom was not taxable under business income section of the Internal Revenue Code); Midwest Research Inst. v. United States, 554 F. Supp. 1379, 1391 (W.D. Mo. 1983) (same), *aff'd*, 744 F.2d 635 (8th Cir. 1984).

McLean has predictably triggered significant commentary from historians and philosophers of science. For example, Professor Laudan has praised the result in *McLean*, but condemned strongly reliance on an "outmoded" and "false stereotype of what science is and how it works." Laudan, *Commentary on Ruse: Science at the Bar—Causes for Concern*, in CREATIONISM, SCIENCE, AND THE LAW: THE ARKANSAS CASE 161, 166 (M. LaFollette ed. 1983) [hereinafter CREATIONISM, SCIENCE, AND THE LAW]. Professor Laudan was responding to Professor Ruse, who testified in the *McLean* case for the plaintiffs and who apparently provided the definition of "science" used by the court. *See* Ruse, *Creation-Science Is Not Science*, in CREATIONISM, SCIENCE AND THE LAW, *supra*, at 150; Ruse, *Response to Laudan's Commentary: Pro Judice*, in CREATIONISM, SCIENCE, AND THE LAW, *supra*, at 167-68.

Professor Laudan argued that each creationist claim should be evaluated "in piecemeal fashion by asking what evidence and arguments can be marshalled for and against each of them." Laudan, *supra*, at 165. If the existing evidence for evolution theory is stronger, then that theory should be taught. *Id.* Professor Laudan's suggestion is not free of problems because it assumes that the claims of the theories are objectively identifiable for purposes of testing them one by one, and that the evaluation of evidence is value-free. *See infra* notes 270-94 and accompanying text. The later assumption is particularly problematic. In *McLean*, the creationists offered the discovery by Dr. Robert Gentry of radioactive polonium holes in granite and coalified woods as evidence of the relatively recent inception of the earth and a flood. These holes are thought to present difficulty for traditional dating methods. Although the court acknowledged Dr. Gentry's discovery as a "mystery" that has "been the subject of some discussion in the scientific community" and "may deserve further investigation," the court nevertheless disregarded Dr. Gentry's finding. *McLean*, 529 F. Supp. at 1270. The court reasoned that traditional scientists had not formulated a creationist-type hypothesis based on the finding, and the "National Science Foundation has not deemed it to be of sufficient import to support further funding." *Id.; see infra* notes 348-56 and accompanying text.

[254] 107 S. Ct. 2573 (1987).

[255] *Id.* at 2583. The Court "did not imply that a legislature could never require

Despite Professor Crews's observation, foundationalist empiricism—the notion that science is truth and that it is both different from, and epistemologically superior to, other forms of knowledge—has not vanished from the law. This claimed epistemological superiority serves as the foundation for the general view that scientific information is qualitatively better input for the marketplace of ideas. Scientific process presents in prepackaged form what the marketplace of ideas seeks ultimately to achieve—truth. The supposed superiority of scientific information allows the commentators to assume that there is some value-free or content-neutral means of formulating a limiting principle to determine the scope of protected experimentation.

It should come as no surprise that legal doctrine accepts what Galileo said: "[I]n the natural sciences . . . conclusions are true and necessary and have nothing to do with human will . . . ."[256] After all, the myth of the superior status of science has blinded even social critics who have waged relentless attacks on the content of knowledge of every discipline *except* science. For example, Durkheim, Marx, and Mannheim all recognized that cultural variations affect the content of knowledge and that the development of science is linked to societal conditions.[257] Nevertheless, all three accepted that the actual content of true scientific knowledge was not so linked. For Durkheim, scientific investigation involved defined phenomena, and "to be objective, the definition must obviously deal with phenomena not as ideas but in terms of their inherent properties. It must characterize them by elements essential to their nature, not by their conformity to an intellectual ideal."[258] For Marx, "only when science proceeds from nature—is it *true* science."[259] For Mannheim, "natural science, especially in its quantifiable

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that scientific critiques of prevailing scientific theories be taught." *Id.* at 2582.

[256] GALILEO, DIALOGUE CONCERNING THE TWO CHIEF WORLD SYSTEMS—PTOLEMAIC & COPERNICAN 53 (S. Drake trans. 1953).

[257] *See* E. DURKHEIM, THE RULES OF SOCIOLOGICAL METHOD 35 (G. Catlin 8th ed. 1966); K. MANNHEIM, ESSAYS ON THE SOCIOLOGY OF KNOWLEDGE 174-75 (1959) [hereinafter K. MANNHEIM, ESSAYS]; Marx, *Economic and Philosophical Manuscripts of 1844,* in THE MARX-ENGELS READER 66, 90-91 (R. Tucker 2d ed. 1978).

[258] E. DURKHEIM, *supra* note 257, at 35.

[259] Marx, *supra* note 257, at 66, 90. Marx, of course, believed that technology made possible by the natural sciences would liberate workers: "But natural science has invaded and transformed human life all the more *practically* through the medium of industry; and has prepared human emancipation, however directly and much it had to consummate dehumanization." *Id.* Professor Mulkay has offered stronger readings of Marx to the effect that the content of science is contingent. *See* M. MULKAY, SCIENCE AND THE SOCIOLOGY OF KNOWLEDGE 6-10 (1979).

Engels appeared to view the content of scientific knowledge as determined by "nature," but he argued that scientific method that sought to group "different natural processes and objects in definite classes . . . [has provided] gigantic strides in our

phases, is largely detachable from the historical-social perspective of the investigator."[260]

To the extent that the notion of science as epistemologically superior knowledge is accepted any longer, that notion is the product of at least three components. First, science is viewed as based on laws of nature or laws of observation that merely describe natural relationships in the physical world and are based on empirical evidence.[261] Second, scientific knowledge claims are testable and can be refuted or falsified by empirical evidence.[262] Third, scientific knowledge claims are the products of an "ethos" or "complex of values and norms which is held to be binding on the man of science."[263] These institutional imperatives include: 1) "universalism" or "the canon that truth-claims, whatever their source, are to be subjected to *preestablished impersonal criteria;*"[264] 2) "communism" or the institutional conception that "[t]he substantive findings of science are a product of social collaboration and are assigned to the community" and, consequently, it is necessary that

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knowledge of Nature . . . [but has] left us as legacy the habit of observing natural objects and processes in isolation . . . ." Engels, *Socialism: Utopian and Scientific,* in THE MARX-ENGELS READER, *supra* note 257, at 683, 695. For a recent and similar treatment of these issues, see R. LEVINS & R. LEWONTIN, *supra* note 43, at 163-208. *See also* J. HABERMAS, *supra* note 139, at 81-122 (proposing an interpretative scheme to determine the meaning of the expansion of the rational form of science and technology); H. MARCUSE, *supra* note 139, at 144-69 (discussing the subject of scientific rationality as a political process).

[260] K. MANNHEIM, IDEOLOGY AND UTOPIA 290-91 (L. Wirth & E. Shils trans. 1936); *see also id.* at 164-71 (contrasting natural science with political science which can never be separated from the continuous process out of which it develops).

[261] *See, e.g.,* I. SCHEFFLER, SCIENCE AND SUBJECTIVITY 8-9 (1967). Professor Scheffler distinguishes between "observational laws," which are "couched in the language of observation and make reference to perceived things and processes," and "theoretical laws," which "are expressed in a more abstract idiom and typically postulate unobservable elements and functions." *Id.* at 8.

[262] *See, e.g.,* K. POPPER, CONJECTURES AND REFUTATIONS 36-37 (1962) [hereinafter K. POPPER, CONJECTURES]; *see also* K. POPPER, LOGIC, *supra* note 217, at 40-41 (arguing that a scientific system must consist of a logical form that "can be singled out, by means of empirical tests, in a negative sense: it must be possible for an empirical scientific system to be refuted by experience"). Professor Popper rejected the doctrine of logical positivism of "inference to theories, from singular statements which are 'verified by experience.' " *Id.* at 40. According to Professor Popper, a theory could never be verified because the theory might be refuted by the next piece of evidence. *Id.* at 252.

[263] R. MERTON, THE SOCIOLOGY OF SCIENCE 268-69 (1973) [hereinafter R. MERTON, SOCIOLOGY]. Professor Merton argued that scientific "ethos" could be traced to "[t]he Puritan complex of a scarcely disguished [sic] utilitarianism; of intramundane interests; methodical, unremitting action; thoroughgoing empiricism; of the right and even the duty of *libre examen;* of anti-traditionalism—all this was congenial to the same values in science." R. MERTON, SCIENCE, TECHNOLOGY & SOCIETY IN SEVENTEENTH CENTURY ENGLAND 136 (1970).

[264] R. MERTON, SOCIOLOGY, *supra* note 263, at 270.

the findings be communicated;[265] 3) "disinterestedness," which is based on the "public and testable character of science" and "has contributed to the integrity of men of science";[266] and 4) "organized skepticism," which is "both a methodological and an institutional mandate" involving the "temporary suspension of judgment and the detached scrutiny of beliefs in terms of empirical and logical criteria."[267] These norms are "moral as well as technical prescriptions" to ensure the production of "certified knowledge," defined as "empirically confirmed and logically consistent statements of regularities (which are, in effect, predictions)."[268] Other institutional imperatives that have been proposed include "norms of originality, humility, independence, emotional neutrality and impartiality."[269]

Despite the seductive simplicity of the traditional empiricist view represented in legal doctrine, the assumptions supporting the traditional view have been battered ceaselessly in recent years. For example, induction in science assumes uniformity in nature, but such uniformity must be either established empirically, in which case there is "vicious circularity," or established formally, in which case the principle of uniformity does not refer to anything in the world.[270] Observational terms in natural laws derive their meaning from the abstract and more speculative terms of scientific theories,[271] and alternate theories cannot be compared because the meaning of terms changes from theory to theory.[272]

The close relationship between fact and theory suggests that facts cannot be formulated in the absence of a theory, which theory then cannot be refuted equivocally by means of those theory-based facts. No fact may qualify automatically as the falsification of a theory.[273] Even

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[265] *Id.* at 273-74.

[266] *Id.* at 276.

[267] *Id.* at 277.

[268] *Id.* at 270.

[269] M. MULKAY, *supra* note 259, at 23.

[270] N. HANSON, PERCEPTION AND DISCOVERY 408 (1969).

[271] *See generally* M. HESSE, THE STRUCTURE OF SCIENTIFIC INFERENCE 1-44, 283-302 (1974).

[272] *See, e.g.*, P. FEYERABEND, PROBLEMS OF EMPIRICISM 52-61 (1981); P. FEYERABEND, REALISM, RATIONALISM & SCIENTIFIC METHOD 76-91 (1981); P. FEYERABEND, AGAINST METHOD 223-85 (1975); T. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 144-59 (2d ed., enlarged 1970); Kuhn, *Reflections on My Critics,* in CRITICISM AND THE GROWTH OF KNOWLEDGE 231, 266-77 (I. Lakatos & A. Musgrave eds. 1970).

[273] For example, scientists in the nineteenth century systematically ignored Semmelweis's evidence that antiseptic technique could help to prevent death from childbed fever even though Semmelweis's empirical evidence ostensibly falsified prevailing theories about the cause of childbed fever. *See* W. BROAD & N. WADE, *supra* note 214, at 136-38; C. HEMPEL, PHILOSOPHY OF NATURAL SCIENCE 3-6 (1966).

theorists who fail to accept that factual assertions are completely contingent upon theoretical assumptions do not deny that "every such [observational] statement is corrigible 'in principle' and may be revised (and perhaps even totally rejected) in the light of further observation and reflection."[274] These more traditional theorists assert that certain observational statements are explained by laws that are "beyond reasonable doubt" so that "the content of [at least some] observation statements is not in actual fact determined by the *totality* of laws and rules of application belonging to the corpus of assumptions of a science at a given time."[275]

Furthermore, observation itself is subject to interpretation. An investigator in an unsettled experimental situation may "*not know what he is seeing*. . . . until his observations cohere and are intelligible as against the general background of his already accepted and established knowledge. . . . This is part of Goethe's meaning when he says that we see only what we know."[276] Professor Polanyi observed that "any critical verification of a scientific statement requires the same powers for recognizing rationality in nature as does the process of scientific discovery."[277]

Perhaps the most profound change in the standard view of science was brought about by Professor Kuhn in his book, *The Structure of Scientific Revolutions*.[278] Professor Kuhn maintains that the standard notion of scientific progress as a succession of theories more closely approaching truth is inaccurate because theories cannot be compared for purposes of determining their "verisimilitude,"[279] or closeness to truth.[280] Rather, Professor Kuhn views the history of a "mature science" as a succession of research traditions that he ambiguously calls "paradigms" and, more recently, "disciplinary matrices."[281] The disci-

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[274] Nagel, *Theory and Observation*, in OBSERVATION AND THEORY IN SCIENCE 15, 20 (1971).

[275] *Id.*

[276] N. HANSON, *supra* note 270, at 108-09.

[277] M. POLANYI, PERSONAL KNOWLEDGE 13 (1958).

[278] T. KUHN, *supra* note 272.

[279] Professor Popper originally used the term verisimilitude in this context. *See* K. POPPER, CONJECTURES, *supra* note 262, at 228-37.

[280] *See* T. KUHN, *supra* note 272, at 144-59.

[281] Professor Kuhn uses "paradigm" in many ways throughout his work. One commentator noted 21 different ways in which Professor Kuhn used the term. *See* Masterman, *The Nature of a Paradigm*, in CRITICISM AND THE GROWTH OF KNOWLEDGE, *supra* note 272, at 59, 61-65. In an effort to avoid further confusion, Professor Kuhn adopted "disciplinary matrix" to replace "paradigm": " 'disciplinary' because it refers to the common possession of the practitioners of a particular discipline; 'matrix' because it is composed of ordered elements of various sorts, each requiring further specification." T. KUHN, *Postscript-1969*, in THE STRUCTURE OF SCIENTIFIC REVOLUTIONS, *supra* note 272, at 174, 182. The disciplinary matrix consists of "symbolic gen-

plinary matrix is shared by a scientific community that can be identified as the "practitioners of a scientific specialty" who have had similar educational and professional experiences.[282] The research traditions shared by such communities define the relevant problems for practitioners and, more importantly, guarantee that the problems have solutions. "Other problems, including many that had previously been standard, are rejected as metaphysical, as the concern of another discipline, or sometimes as just too problematic to be worth the time."[283] Paradigms provide the accepted research methods for solving the relevant problems. The period of general acceptance of a paradigm, the methods it prescribes, and the problems it defines constitute "normal science" and "[p]erhaps the most striking feature of the normal [science] research problems . . . is how little they aim to produce major novelties, conceptual or phenomenal."[284] During periods of normal science, there is, according to Professor Kuhn, little disagreement about the fundamentals of prevailing research tradition, and "a scientific community is an immensely efficient instrument for solving the problems or puzzles that its paradigms define."[285] The practitioner of "normal science" seeks to solve largely predetermined puzzles and not to falsify knowledge claims.

Eventually, normal science is threatened by "crisis" when puzzles that the paradigm cannot solve become too prominent to be ignored or suppressed. The metaphysical assumptions implicit in the prevailing paradigm are questioned and a new research tradition may emerge. According to Professor Kuhn, there are no "objective" criteria that determine the choice of one paradigm over another.[286] The choice "is not and cannot be determined merely by the evaluative procedures characteristic of normal science, for these depend in part upon a particular paradigm, and that paradigm is at issue."[287] Because paradigms are

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eralizations" that are "deployed without question or dissent by group members" and that "are the formal or the readily formalizable components," *id.*; metaphysical assumptions, *id.* at 184; values or qualities valued by a theory, such as the accuracy of predictions, the preference for quantitative predictions, etc., *id.* at 184-85; and "exemplars," or model problem-solutions that can be used to solve other problems, *id.* at 186-91.

[282] *See* T. KUHN, *Postscript-1969,* in THE STRUCTURE OF SCIENTIFIC REVOLUTIONS, *supra* note 272, at 176-77. Professor Kuhn acknowledged in the *Postscript* that "[s]cientific communities can and should be isolated without prior recourse to paradigms; the latter can then be discovered by scrutinizing the behavior of a given community's members." *Id.* at 176.

[283] T. KUHN, *supra* note 272, at 37.

[284] *Id.* at 35.

[285] *Id.* at 166.

[286] *Id.* at 94.

[287] *Id.*

logically different, the ultimate choice of a paradigm must be based on nonrational factors similar to aesthetic reaction and belief that a replacement paradigm will explain the unsolvable puzzles that initially precipitated the crisis.[288]

Professor Kuhn's theories have been challenged by other theorists, such as Dr. Lakatos and Professor Feyerabend.[289] Dr. Lakatos maintains that in any given area of science, there are several competing "research programs" available and the investigator must choose among them after consideration of their predictive powers.[290] Professor Feyerabend argues that "science" is just one of a number of competing ideologies and that there is no "scientific methodology" that serves to separate science from other ideologies, such as religion.[291] Although Professor Feyerabend eliminates rationality as a determinative factor in the choice of methodology, Dr. Lakatos seeks to retain some aspect of rationalism. Dr. Lakatos argues that it is rational to accept a research program that predicts phenomena rather than one that simply "absorbs" phenomena and then offers a post-hoc explanation.[292] But Dr. Lakatos does not purport to provide objective criteria to determine which research program to accept or when to discard a program because it is no longer predictive.[293] Practitioners frequently retain research programs long after there are indications that those programs have been refuted.[294]

Once the standard view of science as objective truth is rejected, claims about the norms governing the communal behavior of scientists may be subject to two observations. First, there is no longer any need to formulate norms that ensure "the extension of certified knowledge," understood as "empirically confirmed and logically consistent" knowledge claims.[295] Such a view of the nature of knowledge claims neglects the interpretive and contingent nature of those claims. Second, to the

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[288] *See id.* at 109-10.

[289] *See generally* Feyerabend, *Consolation for the Specialist,* in CRITICISM AND THE GROWTH OF KNOWLEDGE, *supra* note 272, at 197; Lakatos, *Falsification and the Methodology of Scientific Research Programmes, id.* at 91.

[290] *See* Lakatos, *supra* note 289, at 91.

[291] *See* Feyerabend, *supra* note 224, at 55. Professor Feyerabend also denies that there has ever been a period of "normal science" in the history of thought and that there are no criteria to choose between Dr. Lakatos's various research programs. *See generally* works cited *supra* note 272. For a concise statement of some of Professor Feyerabend's main views, see Feyerabend, *supra* note 224, at 55.

[292] *See* Lakatos, *supra* note 289, at 173-77.

[293] *Id.*

[294] For a fascinating and readable description of how scientists refuse to accept refutation of their beliefs, see W. BROAD & N. WADE, *supra* note 214, at 134-42; *see also supra* note 273.

[295] R. MERTON, SOCIOLOGY, *supra* note 263, at 264.

extent that norms like "universalism" or "organized skepticism" are in some sense actually accepted by the scientific community, those norms are themselves subject to interpretation. Additional norms will influence this interpretation:

> [I]t is more appropriate to treat the norms of science as vocabularies which are employed by members in negotiating meanings for their own and their colleagues' actions. . . . [Social negotiation] is influenced by such factors as members' interests, their intellectual and technical commitments, members' control over valued information and research facilities and the strength of their claim to scientific authority.[296]

The standard view of science as seeking by politically neutral means a politically neutral description of reality "has provided the ideological underpinnings for scientific resistance to attempts by bodies outside of science itself to regulate research."[297] Recognition of the contingent nature of technical and social norms in science, however, invites inquiry into claims that science is politically neutral[298] and that any government involvement (except, of course, massive funding) will most certainly adulterate the quest for "truth" just as personal involvement

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[296] M. MULKAY, *supra* note 259, at 93-94.

[297] A recent sociological study attempts to explain the origin of the technical norm that experimentation is the scientific procedure for arriving at truth. *See* S. SHAPIN & S. SCHAFFER, *supra* note 112, at 15 n.33. Drs. Shapin and Schaffer focus on the controversy between Robert Boyle, who "appears as the major practitioner of systematic experimentation and one of the most important propagandists for the value of experimental practices in natural philosophy," and Thomas Hobbes, who sought "to undermine the particular claims and interpretations produced by Boyle's researches and, crucially, mobilizing powerful arguments why the experimental programme could not produce the sort of knowledge Boyle recommended." *Id.* at 7. Drs. Shapin and Schaffer observe that although both Boyle and Hobbes believed that science had to be "public," Hobbes believed that science was not "the exclusive domain of the professional man . . . [and that] [t]he special interests of professional groups had acted historically to corrupt knowledge." *Id.* at 333. Boyle's view of the public nature of science involved manipulations that were collectively witnessed by "professionals." "Witnessing was regarded as effective if two general conditions could be satisfied: first, the witnessing experience had to be made accessible; second, witnesses had to be reliable and their testimony had to be creditable." *Id.* at 336. The laboratory was the "special space" in which experimentation was to be performed and witnessed, and access to the laboratory was restricted to those who agreed with the fundamentals of the experimental program. This agreement by witnesses with the principle of experimentation as the valid way to "truth" was also the criterion for ensuring that the witnesses were reliable.

The Hobbes-Boyle debate is but one example of how social and technical norms in science are subject to cultural interpretation. For a collection of essays dealing with the role of social factors in the establishment of knowledge claims, see ON THE MARGINS OF SCIENCE: THE SOCIAL CONSTRUCTION OF REJECTED KNOWLEDGE (R. Wallis ed. 1979). Even traditional theorists recognize that experimentation is, to some degree, a contingent feature of modern science. G. KNELLER, *supra* note 138, at 116.

[298] Furrow, *supra* note 120, at 1415-16.

of the scientist will distort particular investigations.[299] Scientists regularly employ political concepts in the formulation of their own norms.[300] Moreover, political factors can influence not only the problems that scientists choose to investigate but also the *content* of the scientific information that is then offered as politically neutral input to resolve political debates and allocational issues.[301]

2. Implications of Rejecting Crude Empiricism

Acknowledgment that scientific knowledge does not have epistemological superiority may lead one to reject a marketplace theory altogether on the ground that truth, if unattainable in the natural sciences, is unlikely to be attainable anywhere else.[302] But rejection of the mar-

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[299] Many of the legal commentators point immediately to Lysenkoism as an example of governmental interference with science. *See supra* note 46 and *infra* notes 304-07 and accompanying text.

[300] For example, the reliance upon economic theories of Malthus by Darwin and his colleagues suggest that they shared "a series of background assumptions about the nature of social life which were derived from dominant features of their own society." M. MULKAY, *supra* note 259, at 107. Professor Mulkay points to studies demonstrating that modern science has been affected by external influences. *See id.* at 109.

[301] Professor Ferguson, for example, assumes that scientific information is epistemologically superior to other information and, in addition, is politically neutral input for resolving political issues. According to Professor Ferguson, "true" scientific knowledge "has a direct and vital bearing on a wide range of public policy issues" including, for example, the use of pesticides, and that scientific speech ought to be protected by the first amendment. Ferguson, *Scientific Expression, supra* note 2, at 543. But as Professors Levins and Lewontin point out, issues about the desirability of pesticides are not as simple as Ferguson would suggest; indeed, these issues have "become debates on philosophy of nature." R. LEVINS & R. LEWONTIN, *supra* note 43, at 241. Defenders of pesticides argue that elements in the environment can be "readily isolated," *id.*; further, they "always try to narrow the scope of the inquiry to their most immediate, direct, and measurable consequence and then downplay them." *Id.* Critics of pesticides argue that "the ecosystem is strongly interconnected, highly variable, and vulnerable." *Id.* The production and sale of pesticides is a billion-dollar business, *id.* at 238, and private industry, state universities, and the United States Department of Agriculture have shared a common commitment to capital-intensive agriculture. *Id.* at 240. This commitment has resulted in a certain type of agricultural technology that defines the dominant research methodology as a search for "magic bullets," *id.* at 241, or chemical control that seeks the most cost-effective agricultural output over the short term. This dominant research methodology regards as illegitimate or misconceived other research that is concerned with biological and interactive control. Professors Levins and Lewontin conclude that "the struggle to change agricultural technology is also a struggle to change the direction of research, a change that can be imposed on the industry only from the outside by the direct and indirect victims of pesticides in collaboration with dissident scientists." *Id.* at 252.

[302] Some first amendment theorists who have examined the sociology of knowledge, especially the sociology of scientific knowledge, conclude that a marketplace theory is untenable. *See, e.g.,* Baker, *supra* note 49, at 976-78 (commenting generally that the first aspect of rationality required by the marketplace model, that people use reason to understand a set reality, is undermined when one rejects the assumption of objective truth since no set reality exists for people to understand).

ketplace theory may not be necessary even if one rejects the epistemological superiority of science. Indeed, several commentators have correctly noted that the marketplace theory seeks a truth that can never definitely be discovered.[303]

In addition, a critical view of science and recognition of its political aspects does not, contrary to the general view, carry the threat that "Lysenkoism" will occur in the United States.[304] The general view portrays Lysenkoism as the probable result of governmental regulation of science.[305] But Lysenkoism, a complicated phenomenon misunderstood by many historians,[306] is much more likely to occur when the government becomes inextricably entangled in the finance and direction of science, as it has in the United States.[307]

Finally, scientific information, if understood as objective truth as it is in the general view, would arguably be *more* amenable to regulation under first amendment doctrine. For example, defamatory speech is not protected because "there is no constitutional value in false statements of fact."[308] Commercial speech receives less protection because its "greater objectivity" makes it possible to determine whether the speech is false and misleading.[309] If scientific speech represents objective truth, then there could be no objection in principle to allowing courts to scrutinize even pure scientific expression to protect the public from false or misleading statements about "reality." Surely, the general view would not support this reduced protection for pure scientific expression.[310]

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[303] *See, e.g.,* DuVal, *supra* note 46, at 191-92 (noting that the fundamental premise of marketplace theory is that no matter how firmly any proposition is believed to be true, there is a substantial possibility that it is untrue); Redish, *supra* note 150, at 617 (posing the dilemma that "the [marketplace] theory appears to suffer from an internal contradiction: the theory's goal is the attainment of truth, yet it posits that we can never really know the truth, so we must keep looking").

[304] *See supra* notes 43-44 and accompanying text.

[305] *See, e.g.,* Robertson, *Scientist's Right, supra* note 2, at 1203 ("[T]he trend toward public control threatens to politicize scientific research, and like Lysenkoism in the Soviet Union, to destroy scientific creativity . . . .").

[306] For a critique of the traditional analyses of Lysenkoism, see R. LEVINS & R. LEWONTIN, *supra* note 43, at 163-96.

[307] *See supra* notes 121-31 and accompanying text; *infra* notes 348-56 and accompanying text.

[308] Gertz v. Robert Welch, Inc., 418 U.S. 323, 340 (1974).

[309] Virginia State Bd. of Pharmacy v. Virginia Citizens Consumer Council, Inc., 425 U.S. 748, 772 n.24 (1976); *see also supra* note 148.

[310] Professor Robertson observes that "[t]he state could argue that it may restrict research that will not be conducted according to [proper] scientific method." He rejects regulation on such grounds because, even if the methodology employed is improper, "the results or data are true (unless fabricated) and it is only the conclusions and their significance that are open to scientific doubt." Robertson, *Scientist's Right, supra* note 2, at 1258 n.249. Professor Robertson does not provide any substantial argument for why the data would be "true," or why the methodology, if improper, should not be

This section of this Article will discuss three implications of rejecting crude empiricism. The first involves the utility of scientific information. The second concerns content discrimination inherent in the formulation of a limiting principle based on "normal" science. The third implication addresses additional difficulties that would arise if it were constitutionally permissible for courts to appeal to "normal" science to determine the scope of protected experimentation.

a. *The Value of Scientific Information*

Although acceptance of a critical view of science may be consistent with retaining some versions of marketplace theory, scientific speech would have to be viewed as no more superior than other types of protected speech. An uncritical acceptance of science as representing truth, however, is unjustified; moreover, an uncritical assumption that the products of applied science or technology represent progress may be dangerous.

The arguments for first amendment protection of experimentation based on experimentation as a necessary precondition of scientific information assume that scientific information is socially valuable. But once scientific information is seen as epistemologically no different from other forms of speech, then protecting activity to ensure a "free flow" of scientific information for its own sake becomes as questionable as protecting any other information-facilitative conduct. Whether a free flow of scientific information enhances "reaching the better decision"[311] becomes an open question. Indeed, it may be argued that the government has funded research that has both produced information and involved methodologies that have had a deleterious impact on people, animals, and the environment. There is no reason to further that impact by according first amendment protection to facilitative conduct simply *because* it results in an information flow. If, however, experimentation is to be protected, then either *all* experimentation—or all that is claimed to be "scientific information-gathering"—must receive prima facie first amendment protection, or claims of protection must be somehow restricted.

b. *Content Discrimination and the Formulation of a Limiting Principle*

If courts were to restrict the protection of experimentation, then

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regulated.

[311] Emerson, *supra* note 8, at 741.

that restriction would necessarily require some recourse to prevailing views of "normal" science because there is no neutral scientific orthodoxy that courts can use to determine the ambit of protection. Courts would be required to characterize conduct as "scientific" experimentation or "nonscientific" experimentation. This type of adjudication, most likely, would create the need for a scientific "elite" whose knowledge of "generally accepted" science would determine which experimentation is protected and which is not.[312]

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[312] *Cf.* Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). In *Frye,* the court held that expert testimony concerning the systolic blood pressure deception test was not admissible because the test had "not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony" about it. *Id.* at 1014. For courts to be able to admit expert testimony concerning deductions from a scientific principle, the principle must "have gained general acceptance in the particular field in which it belongs." *Id. Frye* is cited as proposing the "general acceptance" test for admissibility. *See* Starrs, Frye v. United States *Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702,* 26 JURIMETRICS J. 249, 249 (1986).

In certain respects, Professor Schauer accepts the notion of an "elite" necessary to make sense of a marketplace theory. He argues that:

> [A]ll academic disciplines presuppose that [the] type of rationality [assumed by marketplace theory] has value, and it would be difficult to prove this presupposition unwarranted. When such rational thinking can be assumed, maximum freedom of discussion is a desirable goal. In systems of scientific and academic discourse, the argument from truth has substantial validity.

F. SCHAUER, FREE SPEECH: A PHILOSOPHICAL ENQUIRY 25-26 (1982). Professor Schauer is ultimately skeptical of a marketplace theory because although scientists may be rational, "[i]t is quite another [thing] to say that the same process works for the public at large." *Id.* at 26.

In a recent article, Professor Wonnell argues that "a linkage exists between free speech and truth defined as correspondence with the facts." Wonnell, *supra* note 46, at 681. Professor Wonnell claims that the link that exists between free speech and truth is that free speech will contribute to truth among "elite" cultures or disciplines, but his theory differs from that of Professor Schauer in that, according to Professor Wonnell, Professor Schauer identifies elitism as "the views of a class of people with the officially defined credentials of 'experts.' " *Id.* at 688. Professor Wonnell claims that free speech contributes to truth among elite cultures and that "an elite culture consists of a matrix of thoughts and ideas that tends to evolve among a group whose methods of inquiry involve few 'technological' barriers to truth-finding and whose members manifest a strong demand for truth as such." *Id.* at 695.

Natural science consists of an "elite" culture because of "the existence of observations that lower the cost of finding truth." *Id.* at 713. Professor Wonnell acknowledges Professor Kuhn's importance to understanding the nature of science but rejects Professor Kuhn's view that empirical observations are determined by the prevailing paradigm of "normal science." As long as experimenters keep repeating experiments, the ultimately "true" theory will emerge, although Professor Wonnell accepts that scientists employ "values to assist their work that are not themselves scientific" and that normal science consists of "[a] value-oriented *milieu* of a community of scientists." *Id.* at 714 n.204. Professor Wonnell brushes this "subjectivity" aside and, echoing Professor Popper, argues that science allows us to predict observations and "predictions are themselves important truths." *Id.* at 714. Professor Wonnell concludes that science has contributed to truth and that free speech has assisted science because a comparison between

If, however, *all* claims of experimentation were given prima facie protection and all regulations of experimentation were required to meet first amendment standards, then courts would be faced with an unrealistic option. Any self-proclaimed scientist could require that regulation of her proposed experiment satisfy heightened scrutiny, even when that claim was not accompanied by an additional claim that such activity was expressive in terms of her self-fulfillment. It takes little to imagine the types of claims that could be made and the judicial resources that would be consumed. In addition, it would be difficult to confine information-gathering claims even to those persons purporting to be scientists; the broad protection would effectively become an unfettered right of access for any information-gatherer. Professor Robertson appears to accept this right by advocating protection for all research "including nonscientific research [that] serve[s] useful social functions and may be of equal, if not more, value to the researcher and society."[313] No first amendment theory, however, grants the listener "a general claim for societal (information) allocations—for example, for the wealth that comes if one has unencumbered access to any desired information."[314] Moreover, as mentioned earlier, the general view is predicated upon the strong interest in the free flow of scientific information[315] and the "vital social interest" in the discovery of "truth."[316] According to the general view, the free flow of scientific information is "essential to the decision-making process in a democratic state."[317] This utilitarian justification would be undercut by requiring that *every* claim of experimentation be given prima facie first amendment protection.[318]

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the United States and Soviet Union indicates clearly that "the informational diet being fed the Soviet citizens leaves them much farther from the truth." *Id.* at 691. Unfortunately, "[n]o amount of free speech among the masses will make them experts on the abstract issues" of science, but even a member of the masses can be "a member of the elite on some issues of fact [when] she has a uniquely powerful demand to know that truth and by virtue of her proximity to the concrete data is in a unique position to learn that truth at low cost." *Id.* at 721.

Professor Wonnell's acceptance of truth as the possession of the intellectual elite is an excellent example of the content-related distinctions that inevitably would be used to determine the scope of protection for experimentation. Professor Wonnell seems not to appreciate the implications of his own view, however, especially his acceptance of at least some of Professor Kuhn's fundamental notions.

[313] Robertson, *Scientist's Right, supra* note 2, at 1225 n.89. As noted earlier, however, Professor Robertson at least seems to suggest that *any* precondition of speech would be protected but that scientific preconditions would be protected particularly. *See supra* notes 161-65.

[314] Baker, *supra* note 49, at 1007.

[315] *See* Robertson, *Scientist's Right, supra* note 2, at 1251.

[316] Ferguson, *Scientific Expression, supra* note 2, at 541.

[317] *Id.* at 543.

[318] *See supra* note 311 and accompanying text.

"Normal" science would still have to enter in at some point, even if courts did give every claim of experimentation prima facie protection.[319] Not *all* experimentation, even if protectable, would ultimately be protected. The weighing of scientific interest against other societal concerns would be required.[320] Determinations of "normal" science would necessarily be employed to decide which preconditions were truly "indispensable." The result would be that "traditional" forms of experimentation would thus be weighed more heavily in terms of assessing competing state interests or in assessing whether regulations were sufficiently narrow.[321]

Moreover, once the nature of scientific inquiry is understood as the "normal" science of practitioners, the most important argument for

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[319] An interesting example of the problem of determining what "science" is to "count" in the courts is presented in a recent article by Professors Monahan and Walker, who do not discuss whether research is protected by the first amendment, but rather which research should be determined to have "preferred" status in legal analysis. *See* Monahan & Walker, *Social Authority: Obtaining, Evaluating, and Establishing Social Science in Law,* 134 U. PA. L. REV. 477 (1986). Professors Monahan and Walker argue that although it is widely accepted that empirical data can influence the content of legal doctrine, courts are reluctant to rely on social science research because "[o]btaining social science research has been cumbersome and sometimes controversial; evaluating research has been frustrating and uncertain; and establishing stable judicial views of particular empirical findings has proven elusive." *Id.* at 478. The authors maintain that social science findings have generally been treated as facts in judicial opinions because "[t]he principal similarity between social science research and fact is that both are *positive*—both concern the way the world *is,* with no necessary implications for the way the world *ought* to be." *Id.* at 489. The authors argue, however, that social science research is more like "law" because "both are *general*—both produce principles applicable beyond particular instances," *id.* at 490, and "courts should treat social science data the same way they treat legal precedent." *Id.* at 495. Recognizing that such treatment raises issues concerning the evaluation of social science research, the authors suggest that there are four criteria that courts can use to help resolve these issues of evaluation: approval by the scientific community through disinterested peer review; agreement by the scientific community as to validity of research methodology; ability to generalize research findings; and ability to reproduce results. *See id.* at 499-508.

The analysis of Professors Monahan and Walker illustrates that when courts have to "canonize" some research over other research, they must inevitably turn to "normal science." Indeed, their analysis is nothing but an appeal to accept the supposedly "disinterested" conclusions of scientists. Moreover, Professors Monahan and Walker readily accept the proposition that governmental financing of research is a particularly reliable indication of the quality of research for the purpose of determining which social science research should be given "legal" status.

[320] *See supra* note 19.

[321] The problem created would not be unlike that which Ely identified in his discussion of the scope of protection for communicative activities: "[I]t seems likely that the Court will continue, either explicitly or implicitly, to distinguish between familiar and unorthodox modes of communication . . . ." Ely, *supra* note 48, at 1490. As Professor Baker has pointed out, the balancing approach "naturally tends to favor . . . normality. . . . Reasonableness is basically defined by the status quo . . . ." Baker, *supra* note 75, at 1022.

conferring first amendment status on experimentation dissipates. The general view is uniformly skeptical of government regulation of research because "public control threatens to politicize scientific research."[322] The commentators argue that "[t]he well-known opposition to the work of Copernicus, Galileo and Darwin, for example, arose in each case from a widely shared belief that the knowledge was in some sense 'dangerous' because it conflicted with central assumptions of received tradition."[323] But as Professor Kuhn and others have shown, the primary source of opposition to fundamental changes in scientific thinking has been from *scientists* who have defended the prevailing paradigms.[324] If courts canonize whatever research paradigms exist at any particular time, then nonparadigmatic practitioners, some of whom may later be regarded as responsible for revolutionary changes in scientific thinking, will be excluded from first amendment protection because their experimental methodologies were not derived from prevailing conceptions of "normal" science. Relying on the first amendment to protect science from politicization only leads to further reinforcement of prevailing notions of "normal" science.

Furthermore, to determine what experimentation is and is not protected, courts would invariably become involved in content-related judgments in appealing to "normal science." For example, assume that *X* wrote a book in which she argues that there are probably artifacts dating back to the American Revolution buried in certain parts of Philadelphia, while *Y* wrote a book in which she argues that Atlantis is located under the streets of New York City. Both books would clearly contain protected expression. If a court were to accord less protection to *Y*'s book than to *X*'s book on the ground that *Y*'s book was "silly," such discrimination on content-related grounds would surely be impermissible under the first amendment. Such discrimination would occur, however, if *X*, who is an archaeologist employed by a prestigious university and whose research is funded, can claim that her information-gathering is activity prima facie protected by the first amendment or should be given preference in a balancing process, while *Y*, unemployed and unfunded, cannot make the same first amendment claims. As long as there is no content-neutral means of determining the scope of first amendment protection for experimentation, then any such attempt to segregate certain types of experimentation for protection invariably implicates the concern that "the First Amendment means that government has no power to restrict expression because of its message, its ideas, its

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[322] Robertson, *Scientist's Right, supra* note 2, at 1203.
[323] Ferguson, *Scientific Inquiry, supra* note 2, at 641.
[324] *See supra* notes 278-88 and accompanying text.

subject matter, or its content."[325] The marketplace theorist must reject any such segregation because it translates into precisely what Professor Emerson maintains would invalidate marketplace theory—the possession of truth by some segment of society to the exclusion of others.

This content discrimination may not be ignored as something "built into" the first amendment. The general view maintains that many of the founders shared the enthusiasm of the Enlightenment for scientific endeavors. Professor Emerson is, of course, correct to argue that the marketplace theory of the first amendment in some respects reflects eighteenth-century notions of scientific thought. But it is equally clear that "[t]he Enlightenment recognized no fundamental difference between knowledge of physics and astronomy and knowledge of government and economics. The sciences of man were expected to yield just as precise laws as the physical sciences."[326] The "French minister Turgot criticized the constitutions of the American states . . . on the ground that they were not sufficiently scientific."[327] The colonies responded to such observations with attempts to apply scientific principles to political affairs, such as the Constitutional Society founded in Virginia in 1784 by Philip Mazzei and the Society for Political Inquiries formed in Philadelphia in 1787 by Benjamin Franklin.[328]

Furthermore, "America had never been hospitable to the basic physical sciences . . . . There simply was not support enough to sustain the study and experiment required. . . . Support could be found much more readily for anything promising immediate utility . . . ."[329]

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[325] Police Dep't v. Mosley, 408 U.S. 92, 95 (1972) (citations omitted). The concern for content neutrality has been a consistent theme in first amendment jurisprudence except perhaps for cases dealing with "adult" entertainment. *See, e.g.*, City of Renton v. Playtime Theatres, Inc., 106 S. Ct. 925, 929 (1986) (holding that a city zoning ordinance regulating adult movie theaters constitutes a valid, content-neutral time, place, and manner restriction). In Cornelius v. NAACP Legal Defense & Educ. Fund, 473 U.S. 788 (1985), the Court held that the government could decide to exclude "controversial groups" from a nonpublic forum. *See id.* at 812. The Court's decision should not be read as an abandonment of content neutrality, but as an application (albeit questionable) of the doctrine that when nonpublic fora are involved, the government may decide access based on speaker identity and subject matter. The government restriction must be reasonable in light of the forum's purpose and must be viewpoint-neutral. *See id.* at 806.

[326] B. HINDLE, THE PURSUIT OF SCIENCE IN REVOLUTIONARY AMERICA, 1735-1789, at 377 (1956).

[327] *Id.*

[328] *See id.* at 377-78.

[329] *Id.* at 327. Professor Hindle notes:

> There was a strong anti-intellectual current in [the] emphasis upon the utilitarian [aspects of science] and it was not confined to the barely literate. . . . College graduates were told in one magazine, "You are not to live in the sun, nor moon, nor to ride upon the tails of a comet . . . . A *few* astronomers are enough for an age."

The history of the colonial period indicates that emphasis on basic science was virtually nonexistent, and that the emphasis was placed almost exclusively on the development of technology. Indeed, patent protection, which extended from the outset to inventors' "discoveries"[330] and not to principles or natural phenomena,[331] arguably reflected Jefferson's concern that "tangible benefits ought accrue only to those who could produce a tangible product," and "never 'a mere principle.' "[332] "Moreover, none of the natural philosophers of this early day was a specialized scientist. Natural philosophy was general in its approach to natural phenomena as a whole. . . . It is well-nigh impossible to cite a specialist in any one science [during the colonial period] in the present-day sense."[333]

Professor Emerson's statement about the first amendment reflecting the process of science cannot be removed from its historical context. Science was an intellectual framework that was thought to be applicable for practical purposes to a wide range of human activities; scientific inquiry was certainly not viewed as the activity of specialists. But if courts were required to determine what experimental activity is protected, they would invariably be required to look to the practices of particular groups of experts or intellectual elites. The marketplace theorist must reject any such endeavor. Indeed, the same problem of appeal to "normal" science is implicated when scientific speech—as opposed to experimentation—is sought to be protected as a separate *category* of speech.[334]

Id. at 354 (quoting Smith, *A Charge Which Ought to Be Delivered to the Graduates in the Arts, in All the Colleges in the United States,* 5 UNIVERSAL ASYLUM & COLUMBIAN MAG. 78, 78-79 (1790)). Professor Hindle adds that "[t]he characteristic attitude of the 1780s was that the United States might not be distinguished for its basic science and its fine arts but that in applied science and the practical arts the record was very good." *Id.* at 353.

[330] *See* U.S. CONST., art. I, § 8, cl. 8 (granting the power to Congress to "promote the Progress of Science and useful Arts, by securing for limited times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries").

[331] *See supra* notes 244-48 and accompanying text.

[332] I. CARMEN, *supra* note 2, at 10 (quoting A. DUPREE, SCIENCE IN THE FEDERAL GOVERNMENT 14 (1957)).

[333] R. STEARNS, SCIENCE IN THE BRITISH COLONIES OF AMERICA 5-6 (1970). Curiously, some legal commentators who are aware of the emphasis placed by the colonists on applied rather than basic science nevertheless rely on colonial sources in arguing that the constitutional protection of basic science had strong colonial roots. *See, e.g.,* Delgado & Millen, *supra* note 2, at 356-61 (relying on colonial interest in science to argue that the Framers intended to include basic scientific endeavor as expression protected by the first amendment); Favre & McKinnon, *supra* note 2, at 712-19 (using colonial sources to show the Framers' recognition of the liberty claim in scientific inquiry to argue that the right to engage in basic scientific inquiry is a fundamental right).

[334] *See generally* Ferguson, *Scientific Expression, supra* note 2; Kamenshine, *Em-*

The marketplace theorist may respond that, in light of the social importance of some experimentation, her utilitarian predisposition compels her to accept content discrimination rather than accept a rational basis framework for evaluating regulations imposed on experimentation. This response, however, is no different from arguing that the commercial speech of "large" corporations is to be treated more favorably than the commercial speech of "small" corporations because the former are, in the judgment of the theorist, more socially useful.

The theorist also may respond that, although judicial recourse to notions of "normal" science would require the drawing of "lines," first amendment jurisprudence frequently involves such line-drawing. The theorist could argue that certain defamatory statements,[335] obscenity,[336] and speech posing a "clear and present danger"[337] are all outside the scope of first amendment protection as the result of line-drawing. But drawing lines around "normal" science in order to determine the ambit of first amendment protection would be fundamentally different from drawing lines in these other areas. In cases from these other areas, judicial line drawing is complete once it has been determined that the speech is defamatory, obscene, or poses a "clear and present danger." The speech is not accorded first amendment protection and no further inquiry need be made into its content. With cases defining protection for "normal" science, however, courts would have to treat similar cases—cases involving information-gathering—differently in order to fix the ambit of first amendment protection. Even if all claims of information-gathering were accorded prima facie first amendment protection on the theory that the *category* of information-gathering is itself neutral, content discrimination *within* the broad category would still be required in order to determine which information-gathering was "scientific" and, therefore, protected. This discrimination would necessarily have to be made on the basis of subject matter, which would engage courts in complicated inquiries into the nature of science.[338]

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bargoes on Exports of Ideas and Information: First Amendment Issues, 26 WM. & MARY L. REV. 863 (1985); Redish, *Limits, supra* note 221.

[335] New York Times v. Sullivan, 376 U.S. 254, 271-73 (1964).

[336] Roth v. United States, 354 U.S. 476, 485 (1957).

[337] Schenk v. United States, 249 U.S. 47, 52 (1919).

[338] Of course, in cases where first amendment values are most strongly implicated—those in which the government seeks to regulate experimentation because of a concern for the dissemination of information or in which experimentation involves expression or expressive conduct—the first amendment will apply, thus decreasing any necessity to decide on other grounds the nature of protected claims of information-gathering.

c. *Additional Difficulties Inherent in an Appeal to "Normal" Science*

Even if it were constitutionally permissible for courts to appeal to normal science to determine the scope of experimentation protected by the first amendment, two additional difficulties arise. The first is a practical difficulty. How are courts to determine whether a purported instance of protected experimentation qualifies or not? In *Chakrabarty,* the Court rejected an argument that it should "weigh . . . potential hazards in considering whether [genetically engineered materials were] patentable."[339] It concluded that courts were not equipped to make scientific determinations: "The choice we are urged to make is a matter of high policy for resolution within the legislative process after the kind of investigation, examination, and study that legislative bodies can provide and courts cannot."[340] The practical problem of distinguishing protected experimentation from unprotected experimentation is related to the problem, discussed earlier, of asking courts to distinguish basic research from applied research if, as some commentators suggest, only basic research should receive constitutional protection.[341] Moreover, the Court's concern in *Chakrabarty* is relevant even if the Court were to accept that all forms of experimentation should receive prima facie first amendment protection. In applying complicated "balancing" determinations to research that may threaten various aspects of public health and welfare, the Court would still have to decide whether the challenged regulation met the applicable standard. Such determinations may be more amenable to the legislative process.

The second problem, related to the first, is that, if forced to make determinations about what experimentation is to be given prima facie first amendment protection or how to apply the relevant balancing tests, courts will in all likelihood rely on *government-established* notions of "normal science." For example, in one case not involving the first amendment, a local humane society claimed that a school board violated a state anticruelty statute by allowing a high school student to perform painful cancer experiments on animals.[342] The court acknowledged that the subject matter of the research had "been the subject of many experiments over the years,"[343] but, nevertheless, relied on "ex-

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[339] 447 U.S. at 316-17.

[340] *Id.* at 317.

[341] *See supra* notes 119-48 and accompanying text.

[342] *See* New Jersey Soc'y for the Prevention of Cruelty to Animals v. Board of Educ., 91 N.J. Super. 81, 84, 219 A.2d 200, 202 (Super. Ct. Law Div. 1966), *aff'd,* 49 N.J. 15, 227 A.2d 506 (1967).

[343] *Id.* at 93, 219 A.2d at 207.

perts," who, as "a result of Federal Government grants of some eight million dollars,"[344] concluded "that the use of living animals is essential at the high school level for biology studies in that it . . . helps students have sympathy for living things."[345] In another case, involving "creation science," the court held that, although certain experimental evidence offered by creationists was arguably "scientific" as defined by the "scientific community,"[346] this evidence was insufficient to demonstrate that creationism was a "science," noting that "the National Science Foundation has not deemed it to be of sufficient import to support further funding."[347]

The difficulty in appealing to "normal science" is that most of what might arguably be designated as basic research is funded by the government. This Article refers throughout to Professor Goldberg's argument that various constitutional provisions and constitutional history suggest that there is an implied protection for science in that the government may "establish" science.[348] Professor Goldberg also argues that there is also an implied "free exercise" clause for science: "[A]lthough science may be established in the sense that religion may not, the government nonetheless may not establish a particular scientific theory in the sense of forbidding private opposition to it."[349] Professor Goldberg further notes that "federal government funding accounts for about two-thirds of all American spending on research and development."[350] The federal government spent about six billion dollars on research in the life sciences alone in 1985.[351] The government funds both "intramural" projects, performed within government departments and agencies, and "extramural" projects, performed by nonfederal entities or individuals, including industry, nonprofit industrial or private "think-tanks," state and local governments, academic "think-tanks"

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[344] *Id.* at 95, 219 A.2d at 208.

[345] *Id.*

[346] *McLean,* 529 F. Supp. at 1267, 1270; *see supra* notes 250-53 and accompanying text.

[347] *Id.* at 1270, 1272. This Article is certainly not suggesting that creationist doctrines should be allowed in public schools under the guise of being "scientific." It is, however, suggesting that it would make more sense to recognize creationism cases as involving transparent attempts to establish religion rather than to determine whether creationist doctrines satisfy some definition of "science." *See Edwards,* 107 S. Ct. at 2582-83.

[348] *See supra* notes 239-40 and accompanying text.

[349] Goldberg, *Constitutional Status, supra* note 2, at 29.

[350] *Id.* at 27; *see also* Goldberg, *Reluctant Embrace, supra* note 2, at 1352-53 ("It is well known that the federal government, directly and indirectly, funds the bulk of America's basic research."); *supra* notes 142-47 and accompanying text (analyzing the "industrialization" of science).

[351] OFFICE OF TECHNOLOGY ASSESSMENT, 99TH CONG., 2D SESS., ALTERNATIVES TO ANIMAL USE IN RESEARCH, TESTING, AND EDUCATION 250 (1986).

(some of which may be owned by the government), and academic recipients.[352] Scientific investigations funded by the government involve varying degrees of control by the government *in addition* to the basic control that the government retains to *choose* which research to fund.[353]

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[352] *See* I. CARMEN, *supra* note 2, at 28-30.

[353] For example, the National Institutes of Health (NIH), which allocates approximately 90% of the government funds for health research and development, provides extramural assistance in the form of financial assistance awards or acquisition awards. OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 351, at 260. Financial assistance awards are either grants or cooperative agreements. A grant is used "when the idea for the research or training project is initiated by the investigator . . . [within an area] of interest to NIH." U.S. DEP'T OF HEALTH & HUMAN SERVS., NIH EXTRAMURAL PROGRAMS 4 (1985). NIH also "employs a variety of mechanisms to stimulate submission of applications in areas of high priority or special concern" such as requests that "invite grant applications in a well-defined scientific area to accomplish a specific scientific program purpose." *Id.* When NIH awards a grant, it does not anticipate "substantial program involvement," *id.*, between NIH and the recipient during the performance of the funded activity, and grants are generally awarded to institutions on behalf of principal investigators. *Id.* at 7.

The second form of financial assistance awards are cooperative agreements, which "are similar to grants" but anticipate a "substantial programmatic, i.e., scientific/technical, role" to be played by NIH. *Id.* at 4. "This role may involve cooperation or coordination to assist awardees in carrying out the project or, in some cases, review and approval of certain processes/phases in the *scientific* management of the project." *Id.* (emphasis added). The government issues a request for applications and then negotiates substantive terms and conditions with the awardee based on the programmatic objectives contained in the mandatory request for applications. *Id.* at 4-5.

Both grants and cooperative agreements are subject to a process called "peer review," which begins with an initial review group composed of government and nongovernment scientists. The group examines the scientific merit of the proposal and the "qualifications and experience of the principal investigator." *Id.* at 6. Each member of the group assigns a numerical score to the application from which a collective "priority score" is calculated. The group may request further information from the applicant. After NIH prepares a statement summarizing the position of the initial review group, that statement is forwarded to the particular NIH institute, which reviews the application and summary statement through its individual national advisory board. *Id.* at 6-7. The peer review process is controversial and has been subject to much criticism. *See, e.g.*, W. BROAD & N. WADE, *supra* note 214, at 100-01 (reviewing studies that characterize the peer review system as an "old boy's system" and suggest the choice of which project to fund depends largely on chance).

Acquisition awards, or contracts, are made to nonprofit and commercial entities to "utilize advances in knowledge and technology to search for solutions to specific questions." U.S. DEP'T OF HEALTH & HUMAN SERVS., *supra*, at 8. NIH can "delineate goals, spell out procedures, and reserve all manner of prerogatives" in their contracts. I. CARMEN, *supra* note 2, at 150. A review group defines the scope and the procedures to be used, which are then translated by NIH into advertised requests for proposals. U.S. DEP'T OF HEALTH & HUMAN SERVS., *supra*, at 8. If the proposal involves any "innovative and original approaches to accomplish the [defined] tasks," peer evaluation groups are used, but "government employee review groups" review proposals when the original request defines all requirements and approaches. *Id.* at 9. NIH then negotiates with offerors and may require revised proposals. Occasionally, contracts may be awarded if an unsolicited proposal that meets specific NIH needs is offered. *Id.*

All financial assistance awards and acquisition awards are subject to minimal federal requirements concerning the protection of human and animal subjects, and all

If, however, the government effectively determines the ambit of "normal science" and if "normal science" is to provide the limitation on what experimentation is given first amendment protection, then the only experimenters who can make the "free exercise" claims are those whose paradigms have been "established" by the government through its funding. It is one thing for the government to fund particular types of research. It is another thing for the courts to give first amendment protection *only* to that vision of science that the government has funded. If there is any state of "*totalitarian* interference"[354] that threatens Lysenkoism, it is the combination of the government defining both what science shall be "established," and who can make "free exercise" claims. Professor Carmen argues that "[a] burden of proof lies upon those who claim that particular experimental forms and purposes comprise 'expressive activity' and, hence, require some degree of communal solicitude."[355] He also argues that a grant from the National Science Foundation or National Institutes of Health "would probably be sufficient to meet this burden, though the presumption would be rebuttable."[356] This scheme certainly raises a problem under any theory of "governmental speech."

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awardees are expected to "adhere to commonly accepted norms of sound research design, accurate recording of data, unbiased interpretation of results, respect for the intellectual property of others, and proper management of funds." *Id.* at 11. The primary difference between the acquisition awards and the assistance awards involves the level of government involvement with the specific project. As the above description makes clear, however, no form of NIH assistance is free from government involvement. With cooperative agreements and contracts, NIH participates in the execution of the project and in its "scientific management." Although grants ostensibly do not involve such government intrusion, NIH distributes funds in annual increments, and grantees are required to adhere to the scientific "norms" as understood by peer review committees that involve substantial participation by federal employees.

[354] Feyerabend, *supra* note 224, at 62. Professor Goldberg argues that "although American science is 'established' . . . there is no narrow, rigid hierarchy suppressing all dissent." Goldberg, *Reluctant Embrace, supra* note 2, at 1354. In the same article, however, he acknowledges that the government agencies that fund science are virtually free from legal control *not* because of the complexity of assessing the decisions of such agencies but because "there is sufficiently broad agreement on fundamental issues that nonscientists will generally defer to scientists on questions concerning basic research." *Id.* at 1361. Professor Goldberg notes that the challenger at a funding decision is usually "an outsider with marginal views challenging a respected community of scientists." *Id.* at 1362. The practitioners of the "established" science may, for all intents and purposes, suppress dissident scientists through the control that Professor Goldberg acknowledges to exist over "basic" science. Professor Goldberg argues that this control exists by virtue of consensus, but that begs the question as to whether those who do not agree are simply excluded from the category of "scientists."

[355] I. CARMEN, *supra* note 2, at 42.

[356] *Id.* at 47 n.53.

C. *Summary*

Part II of this Article examined arguments that experimentation should be protected as noncommunicative facilitative conduct. These arguments all focus on the instrumental value of research. The first amendment simply has not been construed to provide general protection to the preconditions of speech. To the extent that the Court has protected information-gathering, the Court has limited that protection to instances when public and press participation in governmental processes have been deemed vital. Moreover, the Court has made clear that not all claims to gather information are to be accorded even prima facie constitutional protection. If a claim to gather information involves the transgression of laws that are unrelated to the suppression of any ultimate dissemination of information, then first amendment scrutiny is not triggered.

The general view seeks to distinguish scientific speech from other types of speech as part of its argument for protecting experimentation as facilitative conduct. But there is no basis for such a distinction. Any argument that predicates protection of experimentation on its status as a precondition of expression also requires that courts determine which preconditions are and are not protected. Because scientific methodology does not exist in some pristine form guaranteed to deliver truth, the best that courts can do is to appeal to prevailing conceptions of "normal" science to determine which preconditions constitute protected experimentation. Even if courts were able to make such determinations, the result would be the canonization of particular forms of experimentation over those forms practiced by dissident scientists not working within the prevailing paradigm. In essence, this choice would represent content-related discrimination against the disfavored practitioners. Moreover, because prevailing paradigms of normal science will almost invariably be those fostered by the government through its massive funding of science, protection would be limited to experimenters who practice the government-approved science. The marketplace model cannot accommodate the elevation of scientific expression as a separate *category* to the status of "super speech" so as to justify the content-based and government-directed selection of protected preconditions.

CONCLUSION

The general view has been that the first amendment provides broad protection for experimentation primarily because scientific information is epistemologically superior to other input into the marketplace of ideas. Parts I and II of this Article have attempted to demonstrate

that the marketplace theory cannot accommodate protection for experimentation without resorting to doctrines inimical to marketplace theory. Part I argued that experimentation not inherently expressive cannot be classified as expression or expressive conduct without ignoring the fundamental tenet of marketplace theory that only communication—even broadly understood—is protected. Part II argued that marketplace theory cannot protect experimentation as a noncommunicative precondition of protected expression unless the government regulates the precondition to suppress the ultimate dissemination of the protected expression.

It is only appropriate to note, in conclusion, that this Article has not examined whether other first amendment theories, or other constitutional doctrines, may succeed where marketplace theory has failed. Marketplace theory was an obvious and necessary target in light of its use as the primary justification for the protection of experimentation. It would seem, however, that many of the problems identified in connection with reliance on marketplace theory would apply as well to the use of alternative first amendment theories to protect experimentation.[357]

[357] *See supra* note 221.